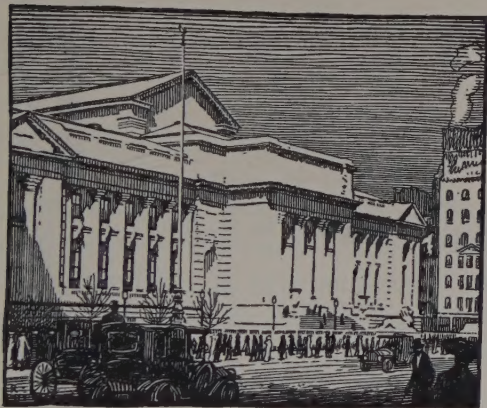


BULLETIN

OF THE

NEW YORK PUBLIC LIBRARY

ASTOR, LENOX AND TILDEN FOUNDATIONS



MARCH 1927

VOLUME 31 - - - NUMBER 3

A BILL FOR THE CROTON RESERVOIR - - - - -	155
NEWS OF THE MONTH - - - - -	159
NEW PERIODICALS - - - - -	161
GARDENS AND GARDENING. PART I - - - - -	163
STARCHES, 1811-1925. PART III - - - - -	178
INTERESTING RECENT ADDITIONS - - - - -	222
CIRCULATION STATISTICS FOR THE MONTH OF FEBRUARY - - - - -	230
PRINCIPAL DONORS IN FEBRUARY - - - - -	231
PUBLICATIONS OF THE NEW YORK PUBLIC LIBRARY - - - - -	232

NEW YORK
1927

PRINTED AT THE NEW YORK PUBLIC LIBRARY

form p5 [iv-5-27 1650]

THE Bulletin is published monthly by The New York Public Library at 476 Fifth Avenue, New York City. Subscription \$1.00 a year, current single numbers 10 cents. Entered at the Post Office at New York, N. Y., as second-class matter, February 10, 1897, under Act of July 16, 1894. Acceptance for mailing at special rate of postage provided for in Section 1103, Act of October 3, 1917, authorized. Printed at The New York Public Library, 476 Fifth Avenue. March, 1927. Volume 31, Number 3.

BULLETIN

OF THE

NEW YORK PUBLIC LIBRARY

ASTOR, LENOX AND TILDEN FOUNDATIONS

VOLUME 31

MARCH, 1927

NUMBER 3

A BILL FOR THE CROTON RESERVOIR

IT would scarcely be fair to say that the Croton reservoir that stood on the present site of the Library seems as distant in time as the Pyramids, but we all feel that the reservoir must have been built a long, long while ago. So long that it requires a special effort to realize that any of us now alive saw with our own eyes the men who did the work, as the reservoir grew from the waste lands of the City commons into the decidedly impressive pile that a larger number of us recall with little effort.

Mr. Lewis E. Price, of Roselle, New Jersey, however, who recently gave the Library the receipted bill his grandfather tendered to the City of New York in December, 1843, for payment for the erection of the reservoir in 1838-1842, feels that his grandfather did not belong to such a distant epoch. The bill was executed in triplicate, one copy for the contractor, Thomson Price and Son, the other two probably for the City and the Board of Water Commissioners.

The facsimile shown herewith tells in striking fashion how the cost of the work was computed, and furnishes an unusual and emphatic demonstration of the advances in prices of labor and materials in the eighty years and more that have rolled by.

It is scarcely fair to compare prices set forth on the bill of 1842 with those of this year 1927, unless one compares, at the same time, the specifications on which the two sets of prices were computed. When the excavation began for the reservoir in 1838 the workmen had practically virgin soil, and few changes had taken place since the days when Indians pitched their tents, or

Washington retreated as the British landed at Kip's Bay and pushed his troops to the heights of Harlem. Streets and avenues had been laid out, to be sure, but most of the evidence on that point was on the map rather than on the ground. It needs no second thought to realize that digging into the dirt on such a spot, and carting stone and bricks and cement for masonry to be erected under those conditions is an emphatically different story from digging such a hole now on the corner of 42nd Street and Fifth Avenue, taking care of the multitude of pipes and conduits that run beneath the surface. In 1838 the traffic problem in this neighborhood called for no special police detail, and the contractor could be happily indifferent about the number of people and vehicles that might go past his work at any given time. Care for the traffic would add materially to the cost of any such work done under present conditions.

Earth excavation that then cost \$.23 per yard would not be figured at much less than \$2.35 to \$7.00 now, if it had to be done within city limits and on busy thoroughfares. It was then, to be sure, a matter largely of pick and shovel with horse or mule drawn carts and wagons. With the present day steam shovels and motor trucks the work would undoubtedly be done much faster, and would cost much less per unit. No doubt the cost this year could be brought near to, if not lower than, the cost of 1838, if hydraulic dredging could be used.

But not on this corner.

Rock excavation that was then set down for \$1.50 would now run from \$5.75 to \$10.50. For the concrete masonry charged for then at the rate of \$.50 a yard, the bill would now stand at something like \$15 to \$19, and brick work would compare as \$8.50 to \$35 or \$39. White pine then cost \$25 per thousand feet, and now can rarely be bought at less than \$125. Sand and gravel have advanced from \$1.20 a yard to \$2.00 to \$5.00. Cast brass was figured at \$.50 in 1838 and costs \$1.50 now. Cast iron ran then at \$.085 per pound and now stands at \$.20. Cast steel plays a unique part as the one article costing less now than then, being estimated at \$.31 in 1838 and about \$.20 now. But as only 14 pounds of cast steel were used in the course of the entire work one could scarcely consider it as the dominant feature.

For the two tablets, giving an account of the system and the reservoir, there was a charge of \$221.94 for the marble tablet that now rests in the south wall of the 40th Street corridor, at the head of the stairs from the 40th Street entrance. The granite tablet now set on the west side of the south court cost "complete, including setting" \$271.45. It is doubtful if a contractor would engage this year to make and set them for less than \$1,000 apiece.

The City of New York
in charge Croton Aqueduct

(21)

To T. Price and Son, Contractors
for Distributing Reservoir, Croton Aqueduct.

I. Sewers & Wells in 40th and 42nd Streets.

To Excavation - Earth	11564.50 yds @ 23 ^{cts}	\$2728.84
To do - Rock	1908.29 " @ 150 ^{cts}	2862.44
To Embankment	962.31 " @ 16 ^{cts}	1539.57
To puddled earth	741.56 " @ 56 ^{cts}	415.25
		\$7726

Masonry: -

To Concrete	221326 yds @ 45 ^{cts}	\$100647.00
To Brick in arches	1488.23 " @ 85 ^{cts}	1264.98
To Cut Stone	18.252 " @ \$36.00	657.07
To Well hammer Stone	8.787 " @ 19.18	168.89
To Rough hammer Stone	116.225 " @ 5.43	631.69
		\$103150.44

Extra items, as directed: -

To White pine boards and plank	3048.13 ft. m. @ 25 ^{cts}	762.08
		\$22379.24

II. Work on Distributing Reservoir: -

To Excavation - Earth	38142.41 yds @ 23 ^{cts}	\$8799.75
To do - Rock	2071. " @ 150 ^{cts}	310.65
To Embankment	6259.66 " @ 16 ^{cts}	1001.55
To do and lining of puddled earth	54135.47 " @ 56 ^{cts}	30327.86
To Sand and Gravel	2411.92 " @ 120 ^{cts}	2894.30
To Wrought iron	6581. " @ 8 ^{cts}	526.48
		\$43561.60

Masonry: -

To Concrete masonry	14414.374 yds @ 45 ^{cts}	\$65469.24
To Brick do in arches	373.911 " @ 85 ^{cts}	317.82
To Cut Stone masonry	1315.170 " @ \$36.00	4734.58
To do Steps	570.916 " @ 145 ^{cts}	826.82
To Well hammer Stone masonry	3390.516 yds @ 19.18	65014.94
To Rough do do do	35332.577 " @ 5.43	191912.52
To Right at Star landing, 5 th Avenue		100. -
To Gate and Valve openings		100. -
To 3 sets of doors, Complete		75. -
To Flag Stone	2792.355 sq. yds @ 145 ^{cts}	4048.91
		\$33466.23

Carried forward \$143552.95 \$22379.24

Extra work on Reservoir, as directed: — Brought forward

Brought forward

403532.988 22,579.24

To filling rubble stone behind terrace walls	459 52 yds @ 32" x 124.75
To laying terraces	327 1/2 yds @ 12" x 418.75
To coping terrace walls	1271 24 yds @ 20" x 330.52
To do do	1158 08 yds @ 30" x 335.52
To timber & plank	1046 1/2 yds @ 25" x 261.67
To 4 windows, top of Stairway, 5th Avenue	x 46.-
To lathing & plastering in Cement, on stairway, 16 sq. yds @ 32" x 29.46	
To Copper roof, extra value of over tin roof, on vaulted por.	x 25.75
To 2 Steel sash doors at door 5th Avenue	x 40.-
To bolts to keep back doors do, do	x 2.00
To Carriage prepared for arch on Stairway 5th Avenue, but not used	x 9.40
To Doors: 1 folding door, head of stairway	
do do do at efficient gatehouse	x 30.-
do 1 temporary door at door	
To Locks: extra value beyond that of common locks of 3 large brass bolts for main door of greenhouse	x 27.35
also, 1 lock for efficient gatehouse door	
To winter canvas at efficient gatehouse	x 5.-
To gutters work at do	x 15.-
To Boring holes for taps & gate rods in arch of main gatehouse	x 10.25
To Balcony on 2nd floor, masonry at connection pipe well	x 16.38
To trade stairs on 2nd floor, ladders to bottom - 40 ft. to 4th floor - 42 ft.	x 23.00
To 2nd floor ladders on pipes in do do do	x 24.-
To painting: 5 doors, 4 windows, masonry of screen frame, iron railing of stairway, gate rods, iron gate bolts - 42 ft. Stair, do, do	x 25.-
To Screens on 2nd floor pipe access	x 10.-
To plastering in cement, slopes of 3 1/2 ft. pipe access, 160 sq. yds @ 25" x 11.65	
To Balcony for iron railing on top of screen on walls	x 5.-
To filling with cement mortar joint of flagging and top brick of Reservoir	2771 1/2 yds @ 9" x 257.22
To dressing back of Cent Stone in top of flagging, as ordered	x 200.-
To labour on materials for putting masonry after work was finished	x 5.44
To marble tablet complete, including setting	x 155.44
To labour of Stone masonry preparing masonry to receive do, as ordered	x 32.50
To do " Cutting Clump holes	2 1/2 yds @ 25" x 4.00, 1221.94
To granite tablet complete, including setting	x 271.65
To painting letters on granite tablets at foot of the north leading valley	x 12.-
To 1/2 work on materials masonry with living pipes on 5th Avenue	x 32.16
To labour, cutting holes in Stone work at efficient gatehouse to	
Screen support Screen	3 1/2 days @ 32" x 6.50
To cast iron	1008 lbs @ 3" x 50.18
To do brass	160 @ 30" x 50.-
To do Steel	14 @ 31" x 4.34
To extra labour on cast iron columns, caused by change of plan of Capt. Cartledge, &c.	x 10.-
To extra value of Cent Stone in corners, caused by substitution of Egyptian Cornice, instead of the square one originally estimated for	x 15.23.75
(as agreed,)	x 78.15 @ 30" x 16.50
Total	=

I hereby certify that, the preceding account for the Distributing Reservoir of the Croton Aqueduct, is correct: amount, four hundred and thirty four thousand five hundred and fifty one $\frac{55}{100}$ dollars.

N. York, 16th Decr 1843

N. Hartie Resident Engineer,
for Division of the C. R.

To The Water Commissioners of the
City of New-York.

Gentlemen

I certify that the preceding account of work done by Thompson Price and Son in the Distributing Reservoir of the Croton Aqueduct, has been performed and completed, according to their contract for the same, and that the items of extra work, specified in said account, were necessary for the vicinity and perfection of said works, and were not provided for in specific prices in the Contract - and that the prices for the same, as stated in said account are just and reasonable.

Total amount; Dollars 434,551. $\frac{55}{100}$

(Signed)

John B. Jarvis
Chief Engineer of the C. R.

N. York, 16th Decr 1843

Estimate paid.

1839 Feb'y 4th \$ 1980.
April 2nd \$ 1500.
May 2nd \$ 1120.
June 3rd \$ 2250.
July 3rd \$ 2520.
Aug. 1st \$ 5550.
Sept. 16th \$ 3570.
Oct. 4th \$ 5100.
Nov. 13th \$ 4950.
1840 Jan. 18th \$ 5160.
Feb. 5th \$ 2250.
May 13th \$ 7470.
June 10th \$ 5550.
July 3rd \$ 26950.
Aug. 6th \$ 15660.
Sept. 3rd \$ 21960.
Oct. 5th \$ 18000.
Nov. 13th \$ 22230.
Dec. 31st \$ 4410.
Grand up \$ 160200.

1841 March 8th \$ 10800.
May 31st \$ 22050.
June 10th \$ 15300.
July 16th \$ 19980.
Aug. 11th \$ 26370.
Sept. 13th \$ 11430.
Oct. 7th \$ 11250.
Nov. 6th \$ 8230.
1842 Jan. 7th \$ 13140.
Mar. 9th \$ 11070.
May 10th \$ 7350.
June 2nd \$ 11970.
July 7th \$ 9000.
Aug. 4th \$ 5780.
Sept. 3rd \$ 12960.
Oct. 6th \$ 25040.
Nov. 26th \$ 10000.
1843 Feb. 18th \$ 5000.
Sept. 6th \$ 30000.
Grand due \$ 255153
\$ 434,551.83

Received from Stephen Allen, Chairman of the Board of
Water Commissioners, nine thousand five hundred and fifty one $\frac{53}{100}$
dollars; which together with the sums noted on the opposite page
and heretofore received, amount to four hundred and thirty four
thousand five hundred and fifty one $\frac{53}{100}$ dollars, and is in full
of the preceding account of work done under our contract for
the distributing Reservoir on the Croton Aqueduct.

\$434,551 $\frac{53}{100}$

Signed in triplicate,
T. Price and Son

by
Thomson Price.

New-York, 27 December 1863

Any one who has ever tried to build, will admit that the bill for "extras" always contains more annoying, exasperating, instructive, illuminating items than the regular bill. Of course the "extras" are necessary and must be included if the completed task is to be satisfactory; but every time any of them are mentioned, with that mention comes the query why they could not have been provided for when the work was first set down on paper. Unquestionably it was better to provide a copper roof (probably for the pent house on top of the north and south dividing wall) rather than use the tin roof called for in specifications. Undoubtedly two steel scrapers for the 5th Avenue entrance were desirable at \$4. Undoubtedly it was well to furnish locks of extra value for the entrance. Undoubtedly it was well to substitute an Egyptian cornice for the square cornice originally specified. Undoubtedly the charge for extras, \$8,639.61, could not be considered excessive, just a bit more than two per cent. of the entire cost of the reservoir. But it is equally undoubted that the builder of the present day will feel that some balm is applied to his chagrin over extras, when he realizes that even an engineer like John B. Jervis had to include extras in his final bill.

The bill tells more than that there has been an advance in prices since it was rendered. Compare it with the figures used by the engineer on his preliminary estimate of the cost of the whole system, and we get one more reminder of the difficulty of setting down in black and white any figures for preliminary estimates that equal those recording the final actual outlays. When John B. Jervis, chief engineer of the New York water works submitted his report to the Board of Water Commissioners of the City of New York on the 12th of December, 1837, he gave a detailed estimate of the cost of the Croton system from the river to the City. He set down his estimate for the distributing reservoir as follows:

48,276	cubic yards	embankment at 40 cents	\$19,310
24,000	"	" puddled do, at 60 cents	14,400
21,000	"	" dry protection wall with facing laid in mortar at \$4	84,000
12,780	"	" hydraulic masonry in centre wall at \$6	76,680
4,140	"	" paving inner slope of reservoir in cement and stone at \$5	20,700
1,700	cubic yards	concrete pavement in the bottom of reservoir at \$6	10,200
			\$225,290
3,500	cubic yards	in division wall at \$6	\$51,000
270	"	" masonry in culvert and well-fall at \$15	4,050
Influent and effluent pipes and stop-cocks, with arches for do., estimated			15,000
			70,050
			\$295,340

In this estimate, to be sure, was no figure for the "Sewers and Wells in 40th and 42nd Streets," that the bill charges \$22,379.24 for, but with this item omitted the cost of the reservoir, as set forth in the second section of the bill, was \$354,669.33, which we must set over against the engineer's estimate of \$295,340.

Suppose that when Thomson Price gave this receipted bill to the City he had been asked what he thought would be on that corner sixty years hence. He would surely have answered that the reservoir would still be standing there! He would have been sure that the work had been made as nearly permanent, not to say eternal, as the skill of his day knew how to make it. And if you had asked him what he would expect to see replacing it, granted that it had to go, the chances are that he would have guessed many things before he would have hit upon a public library, a place where people might gather for fourteen hours a day to read books.

It is equally difficult for us to visualize the appearance of this corner sixty years after the present building was opened, say in 1971. Most of us certainly trust that the present building may be still intact, serving perhaps as the entrance lobby for the much larger building that will house the Library, its collections, readers and staff.

NEWS OF THE MONTH

GIFTS

DURING the month of February, 1927, there were received as gifts 3,604 volumes, 7,253 pamphlets, 4 maps, and 6 prints. Some interesting and important items were the following:

From the Estate of Mrs. John I. Kane came a collection of 836 volumes, 63 pamphlets and 22 periodicals, including the complete works of Washington Irving, New York, 1905, and files of "All the Year Round," and the "Cornhill Magazine." From Miss Claire Brachvogel came a collection of manuscript letters to Mr. and Mrs. Udo Brachvogel from Carl Schurz, Lilli Lehmann, Felix Mottl, Paul Lindau, Joseph Pulitzer, and others. From the Wistar Institute of Anatomy and Biology, Philadelphia, came a copy (No. 231 of 250 printed) in two volumes, of the "Autobiography of Isaac Jones Wistar, 1827-1905," Philadelphia, 1914. Mr. Frank Gray Griswold gave three of his works—"The House Flags of the Merchants of New York, 1800-1860," 1926; "Race Horses and Racing," 1925; and "Horses and Hounds," New York, 1926. From the A. G. Hagstrom Company, Inc., came five of their maps (Lower New York, The Bronx, Brooklyn and Queens, House Number and Subway Guide, and Map of 50-mile Radius from New York). From the Beethoven Association came a copy of "Beethoven Letters in America, Facsimiles with Commentary by O. G. Sonneck, In Commemoration of March 26, 1927," New York, 1927.

The following gifts of prints were received:

From Mr. Warren C. Hutty, an etching by Alfred Hutty, "Beverly Beeches" (issued in one state only; edition limited to 75; plate destroyed); from Mrs. Barton Longacre Keen, a portrait of General Lafayette engraved on copper by James Barton Longacre from pencil drawing made by him from life during Lafayette's last visit to the United States, 1826; from Mr. Jan Matulka, one of his lithographs; from Mr. Ralph M. Pearson, one of his bookplates (in 1st, 2nd, 4th and 5th states); and from Mr. Harry Worcester Smith, the bookplate executed for him by Sidney L. Smith, and accompanying text.

The American Fashion Company gave a copy of the 4th edition of "The American Garment Cutter," New York, c. 1924. From Mr. John Beeby, East Orange, N. J., came a copy of the first edition of "The Absent-Minded Beggar," by Rudyard Kipling. From Mrs. Rudolph Hering came a collection

of 85 volumes and 3 pamphlets. From Wm. A. Pond & Co. came volumes 1 and 2 of the "Catalogue of Opera Librettos printed before 1800," Washington, 1914; and " 'The Star Spangled Banner' (revised and enlarged from the 'Report' on the above and other airs, issued in 1909), by Oscar George Theodore Sonneck," Washington, 1914. Mr. Lyon N. Richardson gave two photostat copies of "John Englishman, In Defence of the English Constitution, Saturday, June 21, 1755, No. IX, Printed and sold by J. Parker and W. Weyman, at the New Printing-Office in Beaver Street, 1755."

From Signor Antonio Rubino came a copy of his "Versi e Disegni" (one of 300 copies printed), Milano, 1911. From Mr. Henry Stoddard Ruggles, came his manuscript work, "The 'Herald-Painters' of New England of the 18th and early 19th Centuries," July 28, 1924. From Willcox & Swiger came 5 volumes in the Turkish language.

ADDITIONS AND USE OF THE LIBRARY IN FEBRUARY, 1927

DURING the month of February, 1927, there were received at the Library 19,442 volumes and 10,024 pamphlets. (These include the additions to both Reference and Circulation Departments.) The total number of readers recorded in the Central Building was 148,850. The number of visitors to the building was estimated at 352,718 (partly a count, partly an estimate).

NEW PERIODICALS

- Accredited news.** Jamestown, N. Y. Quarterly.
Published by the National Association of Accredited Commercial Schools.
- Alabama.**—Forestry Commission. Bulletin. Montgomery, Ala. Irregular.
- American Car and Foundry Company.** News regarding transportation. New York. Irregular.
- American constitution.** Minneapolis, Minn. Weekly.
Published by the American Constitution Association.
- American paint journal.** St. Louis, Mo. Weekly.
- American Refractories Institute.** Technical bulletin. Pittsburgh, Pa. Monthly.
- Anuario de legislación social.** Madrid. Semi-annual.
Published by Spain. — Dirección General de Trabajo y Acción Social.
- Der Apparatebau.** Hannover, Germany. Fortnightly.
Published by the Verband deutscher Apparatebau-Anstalten.
- Archivio di storia della scienza.** Roma, Italy. Quarterly.
- Authors' bulletin.** Winnipeg, Canada. Irregular.
Published by the Canadian Authors' Association.
- Bank of Nova Scotia.** Monthly review. Halifax, N. S. Monthly.
- Boas estradas.** São Paulo, Brazil. Monthly.
Published by the Associação de estradas de Rodagem.
- Book news.** Peoria, Ill. Irregular.
Published by the Manual Arts Press.
- Boys' workers round table.** New York. Quarterly.
Published by the Boys' Club Federation.
- Business woman.** Toronto, Ont. Monthly.
- California monthly.** Berkeley, Cal. Monthly.
Published by the California University Alumni Association.
- Cambridge House bulletin.** London. Irregular.
Published by the Incorporated Cambridge University Settlement.
- Camping.** Cambridge, Mass. Monthly.
Published by the Camp Directors Association.
- Cjonistisze Welt.** Warsaw, Poland. Semi-monthly.
- Commerce.** Paris. Quarterly.
- Comptoir d'escompte de Genève.** Bulletin économique et financier. Genève, Switzerland. Bi-monthly.
- Corporation internationale des négociants en timbres-poste à Bruxelles.** Bulletin mensuel. Bruxelles, Belgium. Monthly.
- Daily film renter and moving picture news.** London. Daily.
- Danzig.**—Statistisches Landesamt. Aus unserer Sammelmappe. Danzig, Europe. Irregular.
— Danziger statistisches Mitteilungen. Danzig. Monthly.
- Double star.** New York. Irregular.
- Elector.** London. Irregular.
Organ of the National Union of Conservative and Unionist Associations.
- Estudiante de español.** New York. Monthly from October to May.
- Ethnologischer Anzeiger.** Stuttgart, Germany. Irregular.
- Exhibitor's herald.** Chicago, Ill. Weekly.
- Fenix.** Mexico. Monthly.
Organ of the Freemasons. Respectable Logia "Fenix," no. 13.
- France.**—Haut Commissariat de la République Française dans les Provinces du Rhin. Bulletin d'informations économiques et financières. Paris. Semi-monthly.
- Game and gun.** London. Bi-monthly.
- Haldeman-Julius** quarterly. Girard, Kansas. Quarterly.
- Hesperian.** South Pasadena, Calif. Monthly.
- Hibernia Bank and Trust Company.** Foreign news and comments. New Orleans, La. Monthly.
- Hoosharar.** New York. Monthly.
Published by the Armenian General Benevolent Union.
- Illustreret Familie-Journal.** Valby, København, Denmark. Weekly.
- Index to labor periodicals.** New York. Monthly.
Published by the Rand School of Social Science. — Labor Research Department.
- Indici del movimento economico italiano.** Padua. Quarterly.
Published by the Istituto di statistica della Reale Università di Padua.
- International Union of Woodworkers.** Bulletin. Amsterdam, Netherlands. Monthly.

- Italian exporter.** Rome, Italy. Irregular.
Published by the Istituto nazionale per l'esportazione.
- Italy.**—Ministero delle Finanze. Conto riassuntivo del tesoro. Roma. Monthly.
- Lion.** Chicago, Ill. Monthly.
Published by the International Association of Lions Clubs.
- London weekly.** London. Weekly.
- Lone star constructor.** Dallas, Texas. Monthly.
Organ of the Associated General Contractors of America. — Texas Branch.
- Long Island agriculturist.** Patchogue, N. Y. Monthly.
- Loyalty.** New York. Irregular.
Published by the Organization Department of the Loyal Legion of America.
- Mahnruf.** Berlin. Monthly.
Published by the Internationale Arbeiter-Hilfe.
- Modern merchant and grocery world.** Philadelphia, Pa. Weekly.
- Molet.** Jerusalem. Monthly.
- Money making.** New York. Monthly.
- Montreal, Canada.**—Health Department. Bulletin d'hygiène. Montréal, Canada. Monthly.
- Mozambique.** Boletim economico e estatistico da provincia de Mozambique. Lourenço Marques, Mozambique, Portuguese W. Africa. Monthly.
- National Bank of Czechoslovakia.** Bulletin. Prague, Czechoslovakia. Irregular.
- National Conference on State Parks.** [Bulletin.] Washington, D. C. Irregular.
- National living.** New York. Irregular.
- New Jersey journal of industry and finance.** Newark, N. J. Monthly.
- New York motor news.** Staten Island, N. Y. C. Monthly.
Organ of the New York Automobile Club, Inc.
- New York Symphony Concert magazine.** New York. 20 issues a year.
- Paint and wallpaper.** London. Monthly.
- Philosopher.** London. Quarterly.
Published by the Philosophical Society of England.
- Players magazine.** Racine, Wis. Quarterly during the school year.
Published by the National Collegiate Players.
- Progress.** Melbourne, Australia. Monthly.
Published by the Henry George Club.
- Publishing.** New York. Monthly.
- Railway expressman.** Chicago, Ill. Monthly.
Published by the Order of Railway Expressmen.
- Revista de occidente.** Madrid. Monthly.
- Revue internationale des tabacs.** Paris. Monthly.
- Revue internationale de la théorie du droit.** Brno, Czechoslovakia. Quarterly.
- Rocky Mountain contractor.** Denver, Colorado. Weekly.
- Rossiiskaya Akademiya Nauk.**—Fiziko-matematicheskii institut. Bulletin mensuel de la station sismique de 2^{de} classe. Leningrad, S.S.S.R. Monthly.
- S. A. J. review.** New York. Weekly.
Organ of the Society for the Advancement of Judaism.
- Sagitario.** La Plata, Argentine. Bi-monthly.
- Self culture.** Kizhanattam, India. Quarterly.
Published by the Indian Academy of Science.
- Sportsman.** Concord, N. H. Monthly.
- Sputnik agitatora.** Moscow, S.S.S.R. Semi-monthly.
- Stadium concerts program-libretto.** New York. July–August.
- Stellenbosch University.** Annale van die Universiteit van Stellenbosch. Stellenbosch, Cape Colony. Quarterly.
- Theatre and school.** Berkeley, Cal. Monthly.
Published by the Drama Teachers' Association of California.
- Touring topics.** Los Angeles, Cal. Monthly.
Published by the Automobile Club of Southern California.
- Train dispatcher.** Chicago, Ill. Monthly.
Published by the American Train Dispatchers Association.
- Unanimidad.** La Guaira, Venezuela. Monthly.
Organ of the Respetable Logia "Unanimidad," no. 3.
- United States.**—Agricultural Economics Bureau. Agricultural economics literature. Washington, D. C. Monthly.
- Vie universelle.** Chatenay-Malabry (Seine), France. Quarterly.
Published by the Association internationale biocosmique.
- Village guardian.** New York. Weekly.
- Westchester safety bulletin.** White Plains, N. Y. Monthly.
Published by the Westchester County Chamber of Commerce, Public Safety Bureau.
- Western financier.** Kansas City, Mo. Monthly.
- Young Zionist.** London. Monthly.
Published by the Association of Young Zionist Societies.
- Yugent.** New York. Monthly.

GARDENS & GARDENING

A SELECTED LIST OF BOOKS PREPARED BY THE GARDEN CLUB OF AMERICA,
THE HORTICULTURAL SOCIETY OF NEW YORK AND
THE NEW YORK PUBLIC LIBRARY

To Accompany an Exhibition of Garden Books in the Central Building, March, 1927

INTRODUCTION

We invite the public to this exhibition of old and new garden books and hope it will be found interesting. It has been planned to appeal to the layman, as well as to the gardener in search of books to help him solve his special problem. Many who are not artists or musicians read books on art and music; so we hope that readers will dip into the delightful books on gardens and be carried on a magic carpet from the city, with its pushing crowds, to a nook in a shady, walled garden, filled with many colored flowers swaying in the fragrant breezes.

This is not a collection of all garden books but of books selected in order to show how, ever since Adam took up his primitive tool to till the ground, the love for gardening has been deep and widespread. It has been shared alike by the poor man brightening his dismal corner of the world with a few pots of flaming geraniums and the rich lady gathering basketsful of roses on her terraces.

In every clime and country when the shepherds ceased wandering about in search of new pastures, they settled down and began to cultivate the soil. Each civilization developed its own type of garden and the history of man can be studied from them. The student of architecture learns about Egyptian king worship from tombs and of mediaeval symbolism from the Gothic cathedrals. The Spanish gardens with their high walled enclosures teach us how the Arabs jealously secluded their women; the still mirror-like pools conducive to meditation in the Persian gardens show a love for quiet thought; while the great stairways leading down from terraces to elaborate parterres and on to distant vistas in the French gardens express a fondness for display and costly entertainments.

Not all garden books are entirely technical. The illustrations of early MSS., one of which, *Le Roman de la Rose*, has been lent by The Pierpont Morgan Library, shows how the knights and ladies played, flirted and read aloud to one another sitting under latticed bowers in a corner of the castle

courtyard. The 16th and 17th century garden books were often collections of prints, which picture the people hunting, riding in carved and gilded coaches and the gardeners with flowing locks, silken hose and buckled shoes. The portrait of Le Notre, the greatest designer of gardens who ever lived, in Triggs' "Garden Craft in Europe," in his huge powdered wig and laced coat shows him to have been an aristocratic and elegant gentleman, a worthy favorite of so splendid a monarch as Louis XIV.

The herbals, like old heads of families, were the ancestors of all later garden books. They combined botany, medicine, and gardening, and contained folk-lore which had been handed down for centuries from mouth to mouth before the days of printing. They are treasures of material about how the people lived, of their fears and superstitions, ills and remedies, of what they ate and drank and how they cooked and preserved, and are far more interesting than the tiresome accounts of royalties and battles which fill the pages of most histories. One early British herbal tells how the Saxons took steam baths to cure their colds by pouring boiling water over heated stones and holding the patient in a position to get all the steam. This must have taken place out of doors in full view of the villagers. Gerard, in his herbal of 1597, was the first to show a picture of the strange new vegetable, the potato, cultivated on Sir Walter Raleigh's Irish estate in 1585.

Many books are only valuable historically and have been included to show what kinds of books were made at certain periods. Some were recognized as very important in their day, such as Jean de La Quintinie's, on his methods of growing fruits and vegetables, which was immediately translated into English in 1693 by John Evelyn, the diarist, who also wrote, in 1664, "Sylva, or a Discourse on Forest Trees," the first plea for the conservation of trees. The early nineteenth century is especially poor and the "Ladies' Companion" of Mrs. Loudon shows how sentimentally the women of that day regarded gardening.

Agriculture, medicine, forestry and botany are the children of gardening, and were formerly included in it. With the growth of science they have gone forth from the parental enclosure, to lead independent lives. Close to the garden wall are the sister arts of architecture and sculpture and bordering upon the property are the new neighbors, chemistry, physics and entomology. Although our list is composed principally of garden books, we have included some on each of these subjects.

We have noted when the books were English, because although we can follow the example of these elder brothers of ours in thoroughness of subject matter, printing and illustrations, we cannot follow their cultural directions. What is suitable for cool, rainy England is not right for the hot, dry and sunny America.



PARADISI IN SOLE
Paradisus Terrestris.

*A Garden of all sorts of pleasant flowers which ours
 English ayre will permit to be nourished wth:*

*with
 A Kitchen garden of all manner of herbes, roots, & fruities,
 for meate or sause wth sed with vs,*

*and
 An Orchard of all sorte of fruitbearing Trees
 and shrubbes fit for our Land
 together*

*With the right orderinge planting & preserving
 of them, and their uses & vertues*

*Collected by John Parkinson
 Apothecary of London*

1629

*Qui veut parangonner l'artifice à Nature
 Et nas parcs à Eden mais force il ingere.*

*Le pas de fielephant par la pas du ciron
 Et de l'igle le vol par cil du moncheron.*

The prints and pictures in the exhibition illustrate the gardens of all periods and countries, the Persian, Indian, Chinese and Japanese, the European, the early Colonial, modern American, down to the French Cubist gardens.

People are moving to the suburbs and joining the growing ranks of gardeners. In response to their demand, gardening books keep tumbling out from the publishers' horn of plenty. Naturally they vary in merit. Some are only for the moment and catch the eye with their attractive jackets, while some are full of advice like Bailey's "Cyclopedia of Horticulture," the one indispensable book. Some are for inspiration, like biographies of nature lovers such as Darwin's "Autobiography and Letters" and Marianna North's "Recollections of a Happy Life," and some are humorous like Richardson Wright's "Truly Rural" and Irvin Cobb's "Abandoned Farmers." Others are travel books like Wilson's "A Naturalist in Western China" and Farrar's "Eaves of the World." Some are decorative only, like "Beautiful Gardens in America," and some are for beginners, as Mrs. Ely's "A Woman's Hardy Garden," and Hottes' "One Thousand and One Garden Questions Answered." It is surprising how many branches and twigs grow out from the main subject.

Many of us find ourselves owners of small pieces of ground, totally ignorant of seeds and soils, and, except for the daisy and the rose, knowing no flowers by their names. Although the most valuable knowledge in all things is derived from experience, in these days of quick results we cannot wait to acquire it, and turn to books full of the accumulated wisdom of the ages to help us avoid mistakes and discouraging failures.

We wish to thank the schools of gardening and horticulture, the editors of garden magazines, landscape architects, the Massachusetts Horticultural Society and Mrs. Louise Beebe Wilder and Mrs. Frances King and all the other friends, who so kindly sent us material and lists of books to work from in response to our request. We also wish to thank the publishers who have generously contributed books for the exhibition. We began with a crop of 1,500 titles and thinned and weeded until we have left about 600, each of which we hope is a perfect specimen plant generously producing flowers of wisdom. Some are sure to have been discarded which should have been retained, and vice versa, but all human endeavor is full of foibles and we apologize for ours.

HELEN M. FOX (Mrs. Mortimer J. Fox)

Chairman

THE LIST

ORDER OF ARRANGEMENT

REFERENCE BOOKS AND PERIODICALS

General Works
Botany
State and Federal Bulletins
Periodicals

HORTICULTURE

Gardening
Garden Flowers
Trees and Shrubs
Vines
Ferns
Wild Flowers
Bulb Gardening
Herbs and Herbals
Lawns
Rock and Alpine, Wall and Water Gardens
Pests and Fertilizers
Plant Breeding
Indoor Gardening
Gardening for Children

AGRICULTURE

General Works
Fruits
Vegetables

GARDENING AS AN ART

Design in the Garden
City Gardening
History of Gardening
Gardening in Other Lands
England
France
Italy
Spain
Morocco
Madeira
Japan
China
India
South Africa

BIOGRAPHIES

REFERENCE BOOKS AND PERIODICALS

GENERAL WORKS

American Joint Committee on Horticultural Nomenclature. Standardized plant names; a catalogue of approved scientific and common names of plants in American commerce. Salem, Mass.: American Joint Committee on Horticultural Nomenclature, 1923. 8°. *R-QEC

Prepared by a sub-committee consisting of Frederick Law Olmsted, Frederick V. Coville, and Harlan P. Kelsey.

Bailey, Liberty Hyde. Manual of cultivated plants. New York: The Macmillan Company; London: Macmillan & Co., 1924. 8°. *R-QEE

A flora for the identification of the most common or significant species of plants grown in the continental United States and Canada, for food, ornament, utility, and general interest, both in the open and under glass. Especially important as it stresses the plant families.

— The standard cyclopedia of horticulture. New York: The Macmillan Company, 1927. new ed. 3 v. 4°. VQR

If there were to be only one book in one's possession it should be this one.

Johnson's Gardener's dictionary and cultural instructor. Rewritten by W. Hemsley and John Fraser. London: George Routledge and Sons, 1916. 8°. English.

Covering the whole field of floriculture, a valuable work both for reference and in practical cultural work.

Miller, Philip. The gardener's dictionary. London, 1735-40. 3 v. 8°.

English.

The forerunner of Bailey's Cyclopaedia.

Nicholson, George. The illustrated dictionary of gardening. London: L. Upcott Gill, [1884]-89. 4 v. in 8. 4°. VQC

English.

A practical and scientific encyclopedia of horticulture for gardeners and botanists. The author was Curator of the Botanical Gardens at Kew. A complementary book to Bailey's. English, yet informative for us.

Ridgway, Robert. Color standards and color nomenclature. Washington, D. C.: The Author, 1912. 8°. MBM

Mr. Ridgway is Curator of the Division of Birds, United States National Museum. The book has a preface telling about color scientifically and gives all tones and shades of colors appearing in nature. By using the names in this book to describe plants one has a standard for general use which is more accurate than depending upon one's imagination for description.

Sturtevant, Edward Lewis. Sturtevant's Notes on edible plants. Edited by U. P. Hedrick. Albany: J. B. Lyon Company, state printers, 1919. 4°. (New York Agricultural Experiment Station, Geneva, N. Y. Annual report for 1919, v. 2.)

NPG (New York State)

Notes on edible plants all over the world. Mr. Sturtevant was formerly director of the New York

*Reference Books and Periodicals, continued.**General Works, continued.*

State Experiment Station at Geneva and left his notes unfinished. The book is full of information.

Veitch, James Herbert. *Hortus Veitchii*; history of the rise and progress of the nurseries of Messrs. James Veitch and Sons,

together with an account of the botanical collectors and hybridists employed by them and a list of the most remarkable of their introductions. London: J. Veitch & Sons, Limited, 1906. 4°. **VQD**

English.

As this nursery sent out collectors and introduced many very valuable plants, this book is very important.

BOTANY

Andrews, Henry C. *The botanist's repository, for new, and rare plants.* London: the author, 1797-[1811?]. 10 v. 4°. † **QEP** English.

Interesting historically as a link in the chain of garden book development.

Artschwager, Ernst Friedrich, and E. M. MILEY. *Dictionary of botanical equivalents.* Baltimore, Md.: Williams & Wilkins Co. cop. 1921. 12°. **QEC**

German-English; French-English; Italian-English; Dutch-English. A help to those reading books in foreign languages on plants.

Bigelow, Jacob. *Florula Bostoniensis.* Boston: Cummings and Hilliard, 1814. 8°. **QFT**

A collection of the plants of Boston and its environs.

Curtis, Carlton Clarence. *Nature and development of plants.* New York: Henry Holt and Company, 1918. 8°.

A textbook in botany by a professor of Columbia University.

Goff, Emmett Stull. *The principles of plant culture.* New York: Macmillan Company, 1916. 8. ed. 12°. (Rural text-book series.) **QEF**

A text for beginners in horticulture and agriculture.

Gray, Asa. *First lessons in botany and vegetable physiology, illustrated by over 100 wood engravings, from original drawings, by Isaac Sprague. To which is added copious glossary, or dictionary of botanical terms.* New York: Ivison & Phinney, 1859. 8°. **QEF**

Jackson, Benjamin Daydon. *A glossary of botanical terms.* London: Duckworth & Co.; Philadelphia: J. B. Lippincott Company, 1916. 3. ed. 8°. English.

Lindsay, Thomas Somerville Reeves. *Plant names.* London: The Sheldon Press; New York: The Macmillan Company, 1923. 8°. (Nature lover's series.) English.

A delightful guide to the meanings of botanical names and the significance and value of plant names generally.

Linnaeus, Carolus. *Genera plantarum.* Francofurti ad Moenum: Sumtu Varrentrappii et Wenneri, 1789-91. 2 v. 8. ed. 8°. **QEC**

First published in 1735 at London.

Linnaeus' systematic arrangement of plants. He is the father of modern botany.

Maudslayi, Benjamin. *The botanic garden; consisting of...representations of hardy ornamental flowering plants cultivated in Great Britain.* London, 1825-[51]. 13 v. 4°. English.

One of the milestones in garden and horticultural literature.

Nuttall, Thomas. *The genera of North American plants and a catalogue of the species to the year 1817.* Philadelphia, 1818. 2 v. 12°. **QFR**

Paxton's Magazine of botany, and register of flowering plants. v. 1-16. London, 1834-49. 8°. **QEA**

English.

Plukenet, Leonard. *Phytographia.* Londini, sumptibus autoris, 1691; secundò excusum, ediderunt T. Davies, T. Payne, L. Davies [etc.], 1769. **QEE**

English.

In Latin. Has plates of flowers. Of historical interest.

Torrey, John. *A catalogue of plants growing spontaneously within thirty miles of the city of New-York.* Published by the Lyceum of Natural History of New-York. [Drawn up by a committee: John Torrey, reporter.] Albany: Printed by Websters and Skinners, 1819. 4°. **QEI p.v.58, no.1**

One can picture what New York must have looked like from this list of the growing plants on its uplands, meadows, and valleys.

Trelease, William. *Winter botany, a companion volume to the author's Plant materials of decorative gardening.* Urbana, Ill.: The author, 1918. 24°. **QEE**

With this guidebook one can gain new pleasure from a winter walk through identifying trees and plants by their cold weather appearance.

STATE AND FEDERAL BULLETINS

Beal, Alvin Casey. Gladiolus studies. I. Botany, history, and evolution of the gladiolus. Ithaca, N. Y., 1916. 8°. (Cornell extension bulletin 9.) **VPZ**

Handsomely illustrated in color and with photographs.

Brainerd, Ezra. Violets of North America. Introduction by George P. Burns. Burlington: Free Press Printing Co., 1921. 8°. (Vermont. — Agricultural Experiment Station. Bulletin 224.) **VPZ**

Flett, John B. Features of the flora of Mount Rainier National Park. Washington: Govt. Prtg. Off., 1916. 8°.

QEI p.v.41, no.6

Griffiths, David. Madonna lily. Washington: Govt. Prtg. Off., 1925. 8°. (United States. — Department of Agriculture. Department bulletin 1331.)

— The production of the Easter lily in northern climates. Washington: Govt. Prtg. Off., 1921. 8°. (United States. — Department of Agriculture. Bulletin no. 962. Professional paper.) **VPZ (U. S.)**

Hottes, Alfred Carl. Gladiolus studies. II–III. Ithaca, N. Y., 1916. 2 v. 8°. (Cornell extension bulletin 10–11.) **VPZ**

II. Culture and hybridization of the gladiolus.

III. Varieties of the garden gladiolus.

Handsomely illustrated in color and with photographs.

Morrison, Benjamin Yoe. Garden irises. [By B. Y. Morrison.] [Washington: Govt.

Prtg. Off., 1926.] 8°. (United States. — Department of Agriculture. Farmers' bulletins. no. 1406.) **VPZ (U. S.)**

Payson, Edwin Blake. The North American species of *Aquilegia*. Washington: Govt. Prtg. Off., 1918. 8°. (United States National Museum. Contributions from the U. S. National Herbarium. v. 20, part 4.) **QEA**

Pennell, Francis Whittier. Scrophulariaceae of the central Rocky Mountain states. Washington: Govt. Prtg. Off., 1920. 8°. (United States National Museum. Contributions from the U. S. National Herbarium. v. 20, part 9.) **QEA**

Spring flowers. Ithaca, N. Y., 1923. 8°. (Cornell rural school leaflet. v. 16, no. 4.) **VPZ**

Well illustrated.

Standley, Paul Carpenter. Flora of Glacier National Park, Montana. Washington: Govt. Prtg. Off., 1921. 8°. (United States National Museum. Contributions from the U. S. National Herbarium. v. 22, part 5.) **QEA**

Wherry, Edgar Theodore. Soil acidity, its nature, measurement, and relation to plant distribution. Washington: Govt. Prtg. Off., 1922. 8°. (Smithsonian Institution. Publications. no. 2630.)

Reprinted from the *Annual report* of the Smithsonian Institution for 1920.

PERIODICALS

Agricultural index. New York.

American agriculturist. New York.

American botanist. Joliet, Ill.

American Dahlia Society. Bulletin. New Haven, Conn.

American florist. Chicago.

American forests and forest life. Washington, D. C.

American Gladiolus Society. Official bulletin. Rochester, N. Y.

American Iris Society. Bulletin. Wellesley Farms, Mass.

American Peony Society. Bulletin. Clinton, N. Y.

Better delphiniums. San Rafael, Cal.

Better homes and gardens. Des Moines, Ia.

Boyce Thompson Institute. Contributions. Yonkers, N. Y.

— Professional papers. Yonkers, N. Y.

Brooklyn Botanical Garden. Record. Brooklyn, N. Y.

Canadian horticulturist. Peterborough, Ont.

Country gentleman. Philadelphia.

Curtis's Botanical magazine. London.
Copy of first number lent by Mrs. Louise Beebe Wilder.

Dahlia Society of New England. Bulletin. New Bedford, Mass.

Florists' exchange and horticultural world. New York.

Reference Books and Periodicals, continued.
Periodicals, continued.

- Flower grower.** Calcium, N. Y.
Flowering plants of South Africa. Johannesburg, South Africa.
The Garden. London.
Garden Club of America. Bulletin. New York.
Garden and home builder. Garden City, N. Y.
Gardeners' chronicle. London.
Gardeners' chronicle of America. New York.
Gardening illustrated. London.
Gartenflora. Berlin.
Gartenschönheit. Berlin.
Harvard University.—Arnold Arboretum. Bulletin of popular information. Jamaica Plain, Mass.
 — Journal. Cambridge, Mass.
Home acres. New York.
Horticulture. Boston.
House beautiful. Boston.
House and garden. New York.

- Jardinage.** Versailles, France.
Journal of agricultural research. Washington, D. C.
Landscape architecture. Harrisburg, Pa.
Market growers' journal. Louisville, Ky.
Missouri Botanical Garden. Bulletin. St. Louis, Mo.
National Plant, Flower and Fruit Guild magazine. New York.
Revue horticole. Paris.
Rhodora. Boston.
Royal Horticultural Society. Journal. London.
Rural New Yorker. New York.
Société nationale d'horticulture de France. Journal. Paris.
South African gardening and country life. Johannesburg, South Africa.
Southern florist. Fort Worth, Texas.
Special crops. Skaneateles, N. Y.
United States.—Department of Agriculture. Crops and markets. Washington, D. C.

HORTICULTURE

GARDENING

- Angier, Belle Sumner.** *See* Burn, Belle Sumner Angier.
Bailey, Liberty Hyde. Garden-making; suggestions for the utilizing of home grounds, by L. H. Bailey, aided by L. R. Taft... F. A. Waugh... and Ernest Walker. New York: Grosset & Dunlap [1908]. 16°. (Garden-craft series.) **VQI**
 A small practical book full of tabloid information.
Blanchan, Neltje, pseud. *See* Doubleday, Nellie Blanchan De Graff.
Bloom, James Harvey. Shakespeare's garden. London: Methuen and Co., 1903. 16°. ***NCVD**
 English.
 Quotations from Shakespeare about flowers and trees—arranged according to months. The author is an English rector.
Bowles, Edward Augustus. My garden in autumn and winter. London: T. C. & E. C. Jack, 1915. 8°. ("My garden" series.) **VQD**
 English.
 — My garden in spring. New York: Dodge Pub. Co. [1914.] 8°. ("My garden" series.) **VQD**
 English.
 Well-written account of the spring bloom.
 — My garden in summer. New York: Dodge Pub. Co. [1914.] 8°. ("My garden" series.) **VQD**
 English.
 An account of summer bloom. Each flower and shrub is described as an unforgettable individual.
Bradley, Richard. New Improvements of Planting and Gardening, both Philosophical and Practical. London: Printed for W. Mears, 1726. 8°. **VQD**
Breck, Joseph. The flower-garden; or, Breck's book of flowers; in which are described all the various hardy herbaceous perennials, annuals, shrubby plants, and evergreen trees, desirable for ornamental purposes, with directions for their cultivation. Boston: J. P. Jewett & Company, 1851. 8°. **VQD**
 Interesting historically. The author was a seedsman and florist and former editor of the *New England farm* and the *Horticultural register*.
Brewster, Kate L. The little garden for little money. Boston: The Atlantic Monthly

Horticulture, continued.

Gardening, continued.

Press [cop. 1924]. 8°. (The little garden series.) **VQG**

An uncommonly practical book on the small flower garden.

Bridgeman, Thomas. The young gardener's assistant, in three parts, containing catalogues of garden and flower seed, with directions under each head for the cultivation of culinary vegetables and flowers. New-York: The author, 1847. 12. ed. 8°. **VQD**

The author was a seedsman and florist. Most interesting historically.

Buist, Robert, joint author. *See* **Hibbert,** and **ROBERT BUIST.**

Burbidge, Frederick William Thomas. The book of the scented garden. London and New York: John Lane, 1905. 12°. (Handbooks of practical gardening. [no.] 24.)

English.

About fragrant flowers, leaves and herbs—a suggestive book about a phase of gardening rarely approached.

Burn, Belle Sumner Angier. The garden book of California, by Belle Sumner Angier. Decorations by Spencer Wright. San Francisco: Paul Elder and Co. [cop. 1906]. 8°. **VQD**

Directions for gardening in California, with descriptions of plants suitable for that climate.

Cloud, Dorothy Mallet-Prevost. The culture of perennials. New York: Dodd, Mead and Company, 1925. 12°. **VQG**

The author is a graduate of the School of Horticulture, Ambler, Pa., and a consulting horticulturist. A practical book with good lists.

Clutton-Brock, Arthur. Studies in gardening; with preface and notes by Mrs. Francis King. New York: Charles Scribner's Sons, 1916. 8°. **VQD**

The author is an authority on gardens. Mrs. King says, "The taste of the author is with rare exceptions based on principles and therefore cannot but be sound." It lays down principles and has notes on special flowers.

Cobb, Irvin Shrewsbury. The abandoned farmers, by Irvin S. Cobb; his humorous account of a retreat from the city to the farm. New York: George H. Doran Company [cop. 1920]. 8°. **NBX**

Cran, Marion Dudley. The garden of ignorance; the experiences of a woman in a garden, by Mrs. George Cran. New York: Brentano, 1913. 12°. **VQE**

English.

A series of essays on the author's experiences in keeping her garden. This work is mainly valuable for its enthusiasm.

Curtis, Charles Henry. Annuals hardy and half-hardy. London: T. C. and E. C.

Jack [1912?]. 8°. (Present day gardening. [v. 12.]) **VQH**

A small and careful selection of the best annuals, clear because it is limited.

Dixon, Royal. The human side of plants. New York: F. A. Stokes Co. [1914]. 8°. **QEI**

About plants that walk, eat insects, mimic, etc. Very enlightening and tells facts in a striking way.

Doubleday, Nellie Blanchan De Graff. The American flower garden, by Neltje Blanchan [pseud.], planting lists by Leonard Barron; illustrated with one hundred full-page photographs. New York: Doubleday, Page & Company, 1909. f°. **†MSD**

A de luxe book on the garden. Has chapters on wild, formal, rock and water gardens, rose gardens, vines and furniture.

Ellwanger, George Herman. The garden's story; or, Pleasures and trials of an amateur gardener. New York: D. Appleton & Co., 1893. 5. ed. 16°. **VQG**

Ely, Helena Rutherford. Another hardy garden book. New York: The Macmillan Company, 1926. 12°.

A brief statement of simple methods of conducting gardening operations, particularly in the small home garden.

— A woman's hardy garden. New York: The Macmillan Company, 1903. 8°. **VQD**

Tells briefly of a few shrubs, hardy perennials, biennials and annuals of simple culture. Is a good book for beginners. Mrs. Ely was the pioneer writer of popular garden books in America.

Fairbridge, Dorothea. Gardens of South Africa, with sixteen full-page illustrations in colour by Elizabeth Drake, E. Struben and E. Barter. London: A. & C. Black, Ltd. [1924]. 8°. **VQG**

Has suggestions for gardening in our warm climates.

Ferrari, Giovanni Battista. De florvm cvltvra libri IV. Romæ: Stephanus Paulinus, 1633. 4°. **VQG**

Finck, Henry Theophilus. Gardening with brains; fifty years' experiences of a horticultural epicure. [New York:] Harper and Brothers, 1922. 8°. **VQE**

By a great musical critic whose avocation was gardening.

Findlay, Hugh. Garden making and keeping. Garden City, N. Y.: Doubleday, Page & Company, 1926. 4°. ***R-VQG**

A practical book by one who has studied and taught for years and knows his subject thoroughly. He tells how to make and keep lawns, gates, wall gardens, rock gardens, and discusses roses, bulbs, annuals and biennials, shrubs, and trees.

Garden guide; the amateur gardener's handbook. New York: The A. T. De La Mare Company, Inc., 1925. 4. ed. 12°.

A concise, well-illustrated manual written by various authorities and dealing with all phases of gardening.

Horticulture, continued.

Gardening, continued.

Hawthorne, Hildegard. The lure of the garden. Illustrated in full color by Maxfield Parrish, Jules Guérin... and others, and with photographs. New York: Century Co., 1911. 4°. **VQD**

A gift book. Chapters on our grandmother's gardens, Washington's garden, the social side of gardens, gardens of some well-known people, etc.

Henderson, Peter. Gardening for pleasure; a guide to the amateur in the fruit, vegetable, and flower garden... New York: The Orange Judd Co., 1888. new ed. 12°. **VQD**

Hibbert, and ROBERT BUIST. The American flower garden directory, containing practical directions for the culture of plants, in the hot-house, garden-house, flower garden and rooms or parlours... Philadelphia: E. L. Carey & A. Hart, 1834. 8°. **VQD**

The authors were growers of exotic plants and trees. Only interesting historically.

Hill, John. Eden: or, A compleat body of gardening. [By John Hill.] London: Printed for T. Osborne [and others], 1757. f°. **VQD**

Lent by Mr. Richardson Wright.

Hill, Thomas. The Gardeners Labyrinth. Containing a Discovrse of the Gardeners life... Gathered out of the best approved writers... by Dydimus Mountain [pseud.]. London: Printed by Henry Ballard, 1608. 4°. **Reserve**

Hole, Samuel Reynolds. Our gardens. London: J. M. Dent & Co., 1899. 8°. **VQD**

English.

Essays on enjoyment of a garden, the pioneering, the water, the wild garden, cottage, children's and town gardens, etc. By the great lover of roses. The Dean's books are always full of good advice charmingly presented.

Hooper, Lucy, editor. The lady's book of flowers and poetry: to which are added, a botanical introduction, a complete floral dictionary, and a chapter on plants in rooms. New York: J. C. Riker, 1842. 12°. **NAEM**

Shows the attitude toward flowers typical of the period.

Hottes, Alfred Carl. A little book of annuals. New York: The A. T. De La Mare Company, Inc. [1925.] 12°. (The "Little book" series.) **VQD**

Short concise accounts of seeds, sowing, transplanting, annuals and shade, hot-beds and cold-frames, where to use them, picking, foliage, etc.

— A little book of perennials. New York: The A. T. De La Mare Company, Inc., 1925. 12°. (The "Little books.")

Everything about perennials in short, concise language. Lists of plants that are blight and cold resistant. Has chapters on plants for shady places,

hardy ferns, herbs, ornamental grasses, propagation, and insects and diseases.

— 1001 garden questions answered... New York: The A. T. De La Mare Company, Inc., 1926. 12°. **VQD**

Well classified, concise answers to many problems; also monthly advice. A good book for the beginner.

Howe, Walter, editor. The garden as considered in literature by certain polite writers. With a critical essay by Walter Howe. New York and London: G. P. Putnam's Sons [cop. 1890]. 24°. **VQE**

Essays by the Plinys, Elder and Younger, Lord Bacon, Sir William Temple, Joseph Addison, Dr. Parnell, Pope, Lady Mary Wortley Montague, Oliver Goldsmith, Thomas Whateley, Horace Walpole, and John Evelyn.

Howell, James Λενδρολογία: Dodona's grove; or, The vocal forrest. Cambridge, 1645. 3. ed. 12°. **Reserve**

Jekyll, Gertrude. Home and garden. Notes and thoughts, practical and critical, of a worker in both. London: Longmans, Green & Co., 1900. 8°. **VQE**

English.

— Wood and garden. Notes and thoughts, practical and critical, of a working amateur. London: Longmans, Green and Co., 1899. 2. ed. 8°. **VQD**

English.

The "amateur" is a great English gardener and, like all her books, this one is full of fine suggestions applicable to all gardens.

King, Louisa Yeomans. Chronicles of the garden, by Mrs. Francis King. New York, London: Charles Scribner's Sons, 1925. 8°. **VQD**

A collection of reprinted papers, each with a good idea.

— The little garden, by Mrs. Francis King... Boston: The Atlantic Monthly Press [cop. 1921]. 8°. **VQD**

A fine book for the beginner who owns a small place. Lists of plants.

— The well-considered garden, by Mrs. Francis King. New York: Charles Scribner's Sons, 1915. 8°. **VQD**

Chapters on color, on placing and harmonizing of flowers together, on spring bulbs, etc. Many ideas and suggestions.

The Language of flowers... Fifth American edition. Philadelphia: Lea & Blanchard, 1839. 24°. **QEG**

English.

Interesting historically as indicating the growth or expression of the sentimental side of gardening.

Lindley, John, and SIR JOSEPH PAXTON. Paxton's flower garden. London: Bradbury & Evans, 1850-53. 3 v. 4°. **VQD**

English.

Discusses the new and remarkable plants introduced into cultivation. This book is necessary to the horticulturist. Has beautiful color plates.

Loudon, Jane Webb. The Ladies' companion to the Flower garden. Being an

*Horticulture, continued.**Gardening, continued.*

alphabetical arrangement of all the ornamental plants usually grown in gardens and shrubberies; with full directions for their culture. London: William Smith, 1841. 16°. English.

— The Ladies' magazine of gardening. [v. 1, 1842.] London, 1842. 8°. **VQA**

English.

No more published.

Amusing, it is true, but indicative of a growing popular interest in gardens.

Lounsberry, Alice. Gardens near the sea: the making and care of gardens on or near the coast, with reference also to lawns and grounds and to trees and shrubbery. With ...color-plates from paintings by H. W. Faulkner. New York: F. A. Stokes Co. [1910.] 8°. **VQG**

McDonald, Donald. Sweet-scented flowers and fragrant leaves. New York: Charles Scribner's Sons, 1895. 12°. **QEG**

McFarland, John Horace. My growing garden...illustrated with photographs by the author and Robert B. McFarland. New York: The Macmillan Company, 1915. 12°. **VQD**

Enthusiastically written experiences of a garden lover, with many practical suggestions.

McLaren, John. Gardening in California, landscape and flower. San Francisco: A. M. Robertson, 1914. [2. ed.] 8°. **VQD**

A general treatise on gardening suited to California climate. By the man who created the Golden Gate Park.

Macself, Albert James. Hardy perennials. New York: Charles Scribner's Sons, 1925. 8°.

English.

A very sketchy treatment of many perennials.

— Plants from seed... New York: Charles Scribner's Sons [1926]. 8°. (The home garden books.) **VQG**

English.

A practical book on many plants raised from seed.

Maeterlinck, Maurice. The intelligence of the flowers; translated by Alexander Teixeira de Mattos. New York: Dodd, Mead and Company, 1907. 8°. **QEL**

Tells of the wonders of plant life.

Martineau, Alice Vaughan-Williams. Gardening in sunny lands; the Riviera, California, Australia, by Mrs. Philip Martineau ...with an introduction by Edith Wharton. London: R. Cobden-Sanderson [1924]. 8°. **VQG**

English.

With so many new homes being built in warm regions this book fills a real need.

— The herbaceous garden; with an in-

troduction by William Robinson. London: Williams & Norgate, 1913. 8°. **VQD**

English.

Has good plant lists. Written from English standpoint but contains good suggestions.

— The secrets of many gardens, by Mrs. Philip Martineau. London: Williams & Norgate, 1924. 8°. **VQG**

English.

A chatty book by one who has travelled a good deal, with seeing eyes, through gardens.

Maxwell, Sir Herbert Eustace, 7th bart. Flowers; a garden note book, with suggestions for growing the choicest kinds. Glasgow: Maclehose, Jackson & Co., 1923. 4°. **VQG**

English.

Charmingly written, with suggestions applicable to America.

Meager, Leonard. The English gardner: Or, a sure Guide to Young Planters & Gardners. London: Printed by J. Dawks, for M. Wotton and G. Conyers, 1699. 9. ed. 8°. **VQD**

Miller, Wilhelm, editor. How to make a flower garden; a manual of practical information and suggestions... New York: Doubleday, Page & Co., 1910. 4°. **VQG**

A compilation of articles by such experts as L. H. Bailey, M. G. Kains, Leonard Barron and others on various phases of gardening.

— What England can teach us about gardening. Garden City, N. Y.: Doubleday, Page & Company, 1911. 4°. **VQG**

By the one time horticultural editor of *Country life in America*. To discover what the best English effects are and how we can reproduce them and to help lay the foundations for an American style of gardening. The purpose of the book is to stimulate and to inspire people to make more and better gardens.

Mitchell, Sydney Bancroft. Gardening in California; a guide for the amateur on the Pacific slope. Garden City, N. Y.: Doubleday, Page & Company, 1923. 8°. **VQG**

Has chapters on planning the small garden, color and continuity, the best trees, shrubs, vines, perennials and annuals, bulbs, rock and water gardens, all adapted to conditions on the Pacific slope of California.

Ortloff, Henry Stuart. A garden blue-book of annuals and biennials... Garden City, N. Y.: Doubleday, Page & Company, 1924. 8°. **VQG**

Mr. Ortloff is a landscape architect. His book tells about annuals and biennials and how to use them in many places.

Papworth, John Buonarotti. Hints on ornamental gardening. London: R. Ackermann, 1823. 4°. **3-MSF**

Paxton, Sir Joseph, joint author. See Lindley, John, and SIR JOSEPH PAXTON.

Pellett, Frank Chapman. American honey plants, together with those which are of special value to the beekeeper as sources of

*Horticulture, continued.**Gardening, continued.*

pollen. Hamilton, Ill.: American Bee Journal, 1920. 8°. **VPV**

Valuable, as it increases one's knowledge of the plants' characteristics.

Phillpotts, Eden. My garden. London: "Country Life," Ltd.; New York: Charles Scribner's Sons, 1906. 8°. (The "Country life" library.) **VQD**

English.

Descriptions of the author's experiences in his south of England garden. Mentions many little known plants.

Prince, William. A short treatise on horticulture. New-York: Printed by T. and J. Swords, 1828. 12°.

Lent by Mr. Richardson Wright.

Quackenbush, Alice T. A. All in a garden fair, with an introduction by Helen Morgenthau Fox; cover, frontispiece and decorations by Mary W. Haring. New York: A. T. De La Mare Company, Inc., 1925. 8°. **QEG**

Poetic viewpoint of gardening; essays on plant names, plant lore and uses of flowers.

Rea, John. Flora: seu, De florum cultura. Or, a complete florilege furnished with all requisites belonging to a florist. London: Printed...for George Marriott, 1676. The second impression. f°. † **VQG**

Rehmann, Elsa. Garden-making. With supplementary text and illustrations from photographs by Antoinette Perrett. Boston and New York: Houghton Mifflin Company, 1926. 8°. **MSD**

Discusses garden design in its simplest forms. Has chapters on fragrance, statues, seats, vines, shrubs and trees, annuals, and autumn flowers. Full of ideas and suggestions.

Reid, John. The Scots gard'ner, together with the gard'ners kalendar. Edited by A. H. Hyatt. London: T. N. Foulis, 1907. 16°. **VQD**

With a facsimile title-page of the original edition printed by D. Lindsay, Edinburgh, 1683.

Robinson, William. The English flower garden and home grounds. Design and arrangement followed by a description of the plants, shrubs and trees for the open-air garden and their culture. London: J. Murray, 1921. 13. ed. 8°. **VQG**

English.

A very important book on gardening with lists and descriptions of many valuable plants.

— The garden beautiful. London: John Murray, 1906. 8°. **MSD**

English.

Mainly about the treatment of woods near a house, but has chapters on other subjects. Everything Robinson writes is very suggestive.

— Gleanings from French gardens: comprising an account of such features of French horticulture as are most worthy of

adoption in British gardens. London: Frederick Warne and Co., 1869. 2. ed. 12°.

British.

VQD

The observations made on a visit to France by the author as a young man, with eyes wide open to see how the French raised their annuals, fruit trees and other striking features in gardening. Valuable to this day for American gardeners.

— The parks, promenades & gardens of Paris described and considered in relation to the wants of our own cities and of public and private gardens. London: John Murray, 1869. 8°. **3 - MSF**

English.

Professor Sargent considers this Robinson's best work.

— The wild garden; or, Our groves and gardens made beautiful by the naturalisation of hardy exotic plants. London: John Murray, 1883. 3. ed. 8°. **QEG**

English.

First published in 1870.

Rogers, William Snow. Planning your garden. Garden City, N. Y.: Doubleday, Page & Company, 1923. 8°. (The Amateur's book of the garden series.) **VQG**

"This volume is designed for those who are not inclined to much use of a professional garden designer."

Basic principles of design and practical instruction for carrying them out.

Roosevelt, Robert Barnwell. Five acres too much. A truthful elucidation of the attractions of the country... New York: Harper & Brothers, 1869. 12°. **VPD**

A humorous book.

Scott, Temple, compiler. In praise of gardens, compiled by Temple Scott. New York: The Baker & Taylor Co., 1910. 16°. **NAEM**

A collection of poems on gardens.

Sedgwick, Mabel Cabot, and **ROBERT CAMERON.** The garden month by month. New York: F. A. Stokes Co. [cop. 1907.] 8°. ***R - VQG**

Describes the appearance, color, dates of bloom, and cultivation of desirable hardy plants for the formal or wild garden, with additional lists of aquatics, vines, etc. Mr. Cameron is gardener of the Harvard Botanical Garden.

Shelton, Louise. Continuous bloom in America; where, when, what to plant, with other gardening suggestions... New York: Charles Scribner's Sons, 1915. 8°. **VQG**

Skinner, Charles Montgomery. Myths and legends of flowers, trees, fruits, and plants, in all ages and in all climes. Philadelphia and London: J. B. Lippincott Company [cop. 1925]. 8°. **QEG**

The myths and origins of flowers, etc.

Thiselton-Dyer, Thomas Firminger. The folk-lore of plants. New York: D. Appleton & Co., 1898. 12°. **ZBT**

English.

Plant worship, proverbs, language, ceremonial use, superstitions, folk-medicine, legendary history, etc.

*Horticulture, continued.**Gardening, continued.*

Thomas, Harry Higgott, editor. *Gardening for amateurs*; a simple, complete, and practical guide for garden lovers, edited by H. H. Thomas. New York: Funk & Wagnalls Co. [1915.], 2 v. 4°. **VQD**
English.

Mr. Thomas is editor of the *Gardener* and has collected valuable information for the beginner.

Triggs, Harry Inigo. *Formal gardens in England and Scotland*. London: B. T. Batsford [1902?], 3 v. f°. **†† MSK**
English.

Treats of planning and arrangement and architectural and ornamental features. Mostly illustrations with some text.

Warner, Anna Bartlett. *Gardening by myself*. New York: Duffield & Company, 1924. 12°. **VQG**

First published in 1872.

Warner, Charles Dudley. *My summer in a garden*; with illustrations by F. O. C. Darley. Boston and New York: Houghton, Mifflin and Company [cop. 1898]. 12°. **VQE**

Essays about gardens.

Watelet, Claude Henri. *Essai sur les jardins*. Paris, 1774. 8°. **MSF**

Whately, Thomas. *Observations on modern gardening*, illustrated by descriptions. London: Printed for T. Payne, 1770. 8°. **MSD**

Wilder, Louise Beebe. *My garden*. Illustrated by Will Simmons. Garden City, N. Y.: Doubleday, Page & Co., 1916. 8°. **VQD**

With chapters on the herb garden, roses and climbers, seasonal bloom, and flowering trees and

shrubs. By one of the most distinguished American writers on gardens.

Willmott, Ellen Ann. *Warley Garden in spring and summer*. London: Bernard Quaritch, 1909. f°. **†† MSK**
English.

A series of photographs of scenes and flowers in the garden of a famous horticulturist.

Wolseley, Frances Garnet Wolseley, viscountess. *Gardening for women*. London: Cassell and Co., Ltd., 1908. 8°. **VQD**

English.

The authoress is principal of the Glynde School for Lady Gardeners in Sussex. Gardening as a profession for women is discussed, also the colleges and schools for lady gardeners in Great Britain and America.

Wright, Richardson Little, editor. *House & garden's book of gardens*. New York: Condé Nast & Company, 1921. f°. **† MSF**

Disconnected articles taken from the magazine, with their illustrations. A selection of good things. Mr. Wright is the editor of *House and garden*, and a devoted worker for the advancement of horticulture in America.

— *The practical book of outdoor flowers*. Philadelphia and London: J. B. Lippincott Company, 1924. 8°. *** R-VQG**

As in all of Mr. Wright's books, original remarks and descriptions enliven the practical information. Data on soils, rearing plants, enemies, managing the garden, perennials, annuals, bulbs and roses, and rock gardens.

— *Truly rural*. Boston and New York: Houghton Mifflin Company, 1922. 12°. **NBQ**

An amusing and witty book for the lover of the out-of-doors.

Wright, Walter Page. *Hardy perennials and herbaceous borders*, illustrated in colour. New York: F. A. Stokes Co. [1913.], 8°. **VQH**

English.

Many suggestions applicable to American gardens, especially those relating to design and artistic treatment.

GARDEN FLOWERS

CARNATIONS

Allwood, Montagu C. *Carnations for every garden and greenhouse... with a foreword by the Rt. Hon. the Lord Lambourne*. London: Country Life [1926]. 8°. **VQH**
English.

A complete story of the carnation and how to grow it under all kinds of indoor and outdoor conditions—by the man who originated the race of *Dianthus Allwoodii*.

Cook, Ernest Thomas, editor. *Carnations, picotees, and the wild and garden pinks*. Written by several authorities and edited by E. T. Cook. London: Offices of "Country Life," Ltd.: New York: Charles Scribner's Sons, 1905. 8°. ("Country Life" library.) **VQH**

English.

Tells about layering, crossing, and special places in which to plant them, such as rock and town gardens. Has one chapter on carnations in America.

Fletcher, F. J. *Carnations and pinks*. London: Benn Brothers, Ltd., 1922. 8°. (Market nursery work series. v. 4.)

English.

Contains minute directions for raising the carnation.

Weguelin, H. W. *Carnations and picotees for garden and exhibition*. London: G. Newnes, 1900. 12°. **QEG**

English.

A good book, entirely from the English point of view.

CHRYSANTHEMUMS

Herrington, Arthur. *The chrysanthemum*. Its culture for professional growers and amateurs. New York: Orange Judd Company, 1905. 12°. **VQH**

A practical treatise on its propagation, cultivation, training, raising for exhibition and market, hybridizing, origin and history.

*Horticulture, continued.**Garden Flowers — Chrysanthemums, cont'd.*

Powell, I. L. Chrysanthemums and how to grow them, as garden plants for outdoor bloom and for cut flowers under glass. Garden City, N. Y.: Doubleday, Page & Co., 1911. 12°. (Garden library.) **VQH**

Smith, Elmer D. Smith's chrysanthemum manual. [Adrian, Mich.: E. D. Smith & Co.,] 1919. 4. ed. 8°.

Stevenson, Thomas. Chrysanthemums, by Thomas Stevenson, with chapters by C. Harman Payne and Charles E. Shea. With eight coloured plates. New York: F. A. Stokes Co. [1912.] 8°. (Garden flowers in color.) **VQH**

English.

Chapters on the history, seedlings, border chrysanthemums, etc. Also on indoor flowers, exhibitions and pests. Helpful to the American, as it is so general.

DAHLIAS

Gordon, George. Dahlias. With eight coloured plates. New York: F. A. Stokes Co. [1912.] 8°. (Garden flowers in color.) **VQH**

English.

The author is president of the National Dahlia Society of Great Britain.

Norton, John Bitting Smith. Seven thousand dahlias in cultivation. College Park, Md., 1924. 8°. **VQH**

A list of the names of seven thousand dahlias.

Stout, Henrietta Maria Schroeder. The amateur's book of the dahlia, by Mrs. Charles H. Stout, introduction by Mrs. Francis King. Garden City, N. Y., and Toronto: Doubleday, Page & Company, 1922. 8°. **VQH**

The best book to date on the subject. Practical and correct.

Waite, William Henry. A little book of modern dahlia culture. New York: The A. T. De La Mare Company, Inc., 1925. 12°. (The "Little book" series.) **VQH**

The author is the originator of Jersey's Beauty, and others. A practical treatise.

GLADIOLUS

Beal, Alvin Casey. The gladiolus. New York: Orange Judd Company.

Macself, Albert James. Gladioli. New York: Charles Scribner's Sons, 1925. 8°. (The "Home garden" books.) **VQH**

English.

Full information on gladioli as grown and exhibited in England. General enough to be valuable for American readers.

IRIS

Dykes, William Rickatson. The genus *Iris*. With forty-seven coloured drawings

by F. H. Round, one coloured plate of seeds by Miss R. M. Cardew and thirty line drawings by C. W. Johnson. Cambridge [Eng.]: University Press, 1913. f°.

English.

A remarkable and sumptuous book; the great monograph on this flower, with natural size color plates.

Lent by Mrs. Mortimer J. Fox.

— A handbook of garden irises. London: M. Hopkinson & Co., Ltd., 1924. 8°. **QEP**

English.

The author was secretary of the Royal Horticultural Society and the authority in England on irises.

McKinney, Ella Porter. Iris of a little garden. Boston: Little, Brown and Company.

Not seen. Listed for publication in April, 1927.

Stager, Walter. Tall bearded iris (*fleur-de-lis*), a flower of song; names, classification, structure, planting, care, enemies, propagation, hybridism, shipping, uses. Sterling, Ill. [cop. 1922.] 8°. **VQH**

A chapter on the iris in song and on the origin of the name. Also practical information.

Wister, John C. The iris. New York: Orange Judd Company.

By the president of the American Iris Society and the well-known authority on the iris.

LILIES

Adams, Henry Sherman. Lilies; being one of a series of flower monographs. New York: McBride, Nast & Co., 1913. 12°. **VQH**

Careful description of the varieties and species.

Elwes, Henry John. A monograph of the genus *Lilium*. . . Illustrated by W. H. Fitch. [London: Printed by Taylor & Francis, 1877]—80. f°.

Issued in 7 parts, 1877—80.

English.

One of the finest of flower monographs and a work of art.

Jekyll, Gertrude. Lilies for English gardens. A guide for amateurs. London: "Country Life," 1901. 8°. **VQH**

English.

Fine pictures and description of lily culture in England.

Wallace, Alexander. Notes on lilies and their culture; second edition. Colchester, London [printed], 1879. 8°.

English.

Contains Baker's Synopsis of the genus *Lilium*. Dr. Wallace was a successful grower of lilies.

Wilson, Ernest Henry. The lilies of eastern Asia; a monograph. London: Dulau & Company, Ltd., 1925. 4°.

American.

A scientific monograph on these lilies by one who has seen most of them growing in their native habitats and introduced many to cultivation.

Horticulture, continued.

Garden Flowers, continued.

ORCHIDS

Burberry, H. A. The amateur orchid cultivator's guide book. New York: G. P. Putnam's Sons, 1899. 8°. **VQH**

English.

A practical treatise. Mr. Burberry was an orchid grower for the Hon. Joseph Chamberlain. With a preface by Dr. J. M. W. Kitchen, proprietor of Willowmead Gardens, East Orange, N. J.

O'Brien, James. Orchids. With eight coloured plates. New York: F. A. Stokes Co., [1911.] 8°. (Garden flowers in color.) **VQH**

English.

A short treatise on orchids and their cultivation.

Sander's orchid guide, containing all the best known species. St. Albans [England]: F. Sander and Co., [1901.] 4°. **QEG**

English.

Containing all the best known species, varieties and hybrids of orchids in cultivation, their native countries, descriptions, seasons of flowering, best materials of cultivation, temperature, etc., together with names and parentages of all the known hybrid orchids up to Jan. 1, 1901. All arranged in tables.

PANSIES AND VIOLETS

Cook, Ernest Thomas, editor. Sweet violets and pansies. And violets from mountain and plain. Written by several authorities and edited by E. T. Cook. [London:] "Country Life," 1903. 8°. ("Country Life" library.) **VQH**

English.

Collected from articles in *Garden and Country life*. Somewhat old fashioned, dealing with English show pansies, violas, violets of mountain and plain, and sweet violets.

Coon, Nelson. Practical violet culture. New York: A. T. De La Mare Company, Inc., 1925. 12°. **VQH**

The successor to Dr. Galloway's book and the standard American violet book at this time.

Cuthbertson, William. Pansies, violas & violets. With eight coloured plates. New York: F. A. Stokes Co., [1913.] 8°. (Garden flowers in color.) **VQH**

Galloway, Beverly Thomas. Commercial violet culture. New York: A. T. De La Mare Printing & Publishing Co., Ltd., 1914. 3. ed. 12°. **VQH**

Upon methods of growing violets for market by the then Dean of the New York State College of Agriculture, Cornell University.

PEONIES

Harding, Alice Howard. The book of the peony, by Mrs. Edward Harding. Philadelphia: J. B. Lippincott Co., 1917. 8°. **VQH**

All about the peony with full tables of characteristics by an authority on peonies.

— Peonies in the little garden, by Mrs. Edward Harding. Boston: The Atlantic Monthly Press [cop. 1923]. 8°. (The little garden series.) **VQH**

Considered the best small book on this flower.

Harrison, Charles Simmons. A manual giving complete directions for the propagation and cultivation of the peony. Third edition—enlarged and improved. [York, Neb.: York Blank Book Co., 1914.] 8°. **VQE p.v.20, no.7**

ROSES

The **American rose annual**; year-book of rose progress, edited for the American Rose Society. Harrisburg, Pa. 8°. **VQH**

Contains a mine of information for the rose enthusiast attractively presented.

American Rose Society. Standardized rose names. . . West Grove, Pa.: American Rose Society [1924]. 12°. **VPE p.v.225, no.2**

Barron, Leonard, editor. Roses and how to grow them, revised by J. Horace McFarland. Garden City, N. Y.: Doubleday, Page & Company, 1924. 8°. (The amateur's book of the garden series.) **VQH**

Practical, with good lists.

Buist, Robert. The rose manual. Philadelphia: A. Hart, and Lippincott, Grambo, and Co., 1854. 4. ed. 8°. **VQH**

First published in 1844.

Ellwanger, Henry Brooks. The rose. New York: Dodd, Mead and Company, 1921. rev. ed. 16°.

Written by a commercial rosarian. Instructions and lists.

Hole, Samuel Reynolds. A book about roses; how to grow and show them. New edition with an additional chapter and lists of roses, by Dr. A. H. Williams. New York: Longmans, Green & Co., 1913. 12°. **VQH**

English.

First published in 1874.

A classic on the rose by Dean Hole, a great English rosarian. One of the best written garden books.

Jekyll, Gertrude. Roses for English gardens. By Gertrude Jekyll and Edward Mawley. New York: Charles Scribner's Sons, 1902. 8°. (The "Country Life" library.) **VQH**

English.

Written by the dean of women gardeners.

Kingsley, Rose Georgina. Roses and rose growing. London: Whittaker & Co., [1908.] 8°. **VQH**

English.

Practical. Charminglly illustrated.

McFarland, John Horace. The rose in America. New York: The Macmillan Company; London: Macmillan & Co., Ltd., [cop. 1923.] 8°. **VQH**

Mr. McFarland is the editor of the *American rose annual*. Practical, with illustrations from the author's garden.

Horticulture, continued.

Garden Flowers—Roses, continued.

Parkman, Francis. The book of roses. Boston: J. E. Tilton & Co., 1866. 12°. **VQH**

Interesting because of its age and author.

Parsons, Samuel Bowne. Parsons on the rose; a treatise on the propagation, culture, and history of the rose. New York: Orange Judd Co., 1912. rev. ed. 12°. **VQH**

A garden book classic. The edition of 1847 is illustrated by old-fashioned colored plates. A small unillustrated edition was published in 1849. In 1912 the material was edited and modernized; more instructive but less charming.

Paul, William. The rose garden. London: Sherwood, Gilbert & Piper, 1848. 4°. **VQH**
English.

By a professional rosarian. Shows its age only in the lists.

Pemberton, Joseph H. Roses, their history, development and cultivation. London: Longmans, Green & Co., 1908. 8°. ***R-VQH**

English.

Pyle, Robert. How to grow roses. West Grove, Penna.: The Conard-Pyle Company, 1925. 16. ed. 8°.

Principally lists for various purposes.

Redouté, Pierre Joseph. Les roses, peintes par P. J. Redouté, décrites et classées selon leur ordre naturel, par C. A. Thory. Troisième édition, publiée sous la direction de M. Pirolle. Paris: P. Dufart, 1835. 3 v. 8°. **VQH**

Sanders, Thomas William. Roses and their cultivation. A practical guide to the cultivation of the rose, out-doors and under glass. London: W. H. & L. Collingridge [1920]. 12. ed. 12°. **VQH**

English.

So excellent that it has been through many editions. Good lists.

Stevens, Glendon A. Roses in the little garden. Boston: Little, Brown, and Company, 1926. 8°. (The little garden series.) **VQH**

Excellent for the beginner.

Thomas, George Clifford. The practical book of outdoor rose growing for the home garden. Philadelphia and London: J. B. Lippincott Company, 1920. 5. ed. 8°.

With lists and descriptions.

— Roses for all American climates. New York: The Macmillan Company; London: Macmillan and Co., Ltd. [cop. 1924.] 8°. **VQH**

Valuable for what its name implies.

Willmott, Ellen Ann. The genus *rosa* . . . Drawings by Alfred Parsons. London: John Murray, 1914. 2 v. f°. †**QEP**
English.

Wright, Walter Page. Roses and rose gardens; illustrated in colours. London: Headley Brothers [1911]. 8°. **VQH**
English.

SWEET PEAS

Dick, John Harrison. Sweet peas for profit. New York: A. T. De La Mare Printing and Publishing Co., Ltd., 1914. 8°. **VQH**

Cultivation under glass and out-doors. A practical guide to growing the sweet pea for market purposes.

Taubenhaus, Jacob Joseph. The culture and diseases of the sweet pea. New York: E. P. Dutton & Co. [1917.] 12°. **VQH**

The author is plant pathologist and physiologist at the Experiment Station of the Agricultural and Mechanical College of Texas. Gives special emphasis to parts and diseases.

Unwin, Charles W. J. Sweet peas; their history, development, culture. Cambridge [Eng.]: W. Heffer & Sons, Ltd., 1926. 12°. **VQH**

English.

Wright, Horace J. Sweet peas. With eight coloured plates. New York: F. A. Stokes Co. [1914.] 8°. (Garden flowers in color.) **VQH**

English.

Beautiful illustrations. Lists.

(To be concluded)

STARCHES

1811-1925

A LIST OF REFERENCES DEALING WITH THE CHEMISTRY AND TECHNOLOGY OF STARCHES, DEXTRINS AND AMYLASES

COMPILED BY

ROBERT P. WALTON, Science and Technology Division

ORDER OF ARRANGEMENT

STARCHES AND DEXTRINS

CHEMICAL SECTION

- Acid Hydrolysis
- Enzymic Hydrolysis
- Molecular Constitution
- Components of Starch Granule
- Crystalline Dextrins formed by Bacterial Degradation of Starch
- General Chemical Characteristics
 - Reactions with Iodine
 - Reactions with Formaldehyde
 - Reactions with Bases
 - Reactions with Oxidizing Agents
- Ethers and Esters
- Hydrolysis by Salts
- Soluble and Modified Starches
- Preservation of Starch Solutions

PHYSICAL SECTION

- General Physical Characteristics
 - Viscosity and Plasticity
 - Gelatinization
 - Coagulation and Retrogradation
- Microscopic Observations

ANALYTICAL SECTION

- Methods of Determination
 - Polarimetric Methods
 - Saccharimetric Methods

ANALYTICAL SECTION, *continued.*

- Gravimetric Methods
- Iodine Methods
- Specific Gravity Methods
- Comparison of Methods
- Detection, Differentiation and Identification
- Determinations in Various Materials
- Analytical Examination

TECHNOLOGICAL SECTION

- Industrial Sources
- Manufacture of Starch
- Manufacture and Preparation of Dextrin
- Starch Factory Waste Waters
- Industrial Applications of Starch and Dextrin

AMYLASES

- Purification
- General Characteristics
- Activation and Inactivation by Salts, Acids, etc.
- Optimum and Inactivating Temperatures
- Action of Sunlight, Ultra-Violet Rays and Roentgen Rays
- Adsorption of Amylases
- Determination of Activity
 - Determination of Amylolytic Activity
 - Determination of Saccharogenic Activity
- Mould, Fungus, Yeast and Bacterial Amylases
- Sources and Occurrence
- Industrial Applications

PART III

STARCHES AND DEXTRINS, *continued*

COMPONENTS OF STARCH GRANULE, *continued.*

606. Ling, Arthur R., and DINSHAW R. NANJL. Starch. 1. The nature of polymerized amylose and of amylopectin. (Chemical Society of London, Journal, 1923, v. 123, p. 2666-2688.) **PKA**

Give lengthy review. State that in wheat, barley, rice and maize starches, amylose and amylopectin occur in the constant ratio of 2 to 1. Describe their separation by 8 physical and chemical methods. Method adopted consists of treating starch paste at 50° with dried precipitated barley diastase, the amylose being completely converted to maltose and the amylopectin remaining unattacked. Freshly precipitated

diastase attacks amylopectin yielding the α -amylodextrin of Baker, which, upon extraction with boiling 80% alcohol, is obtained entirely devoid of Cu red. power, $\alpha_D = 193^\circ$, is hydrolyzed with precipitated malt diastase at 70° to a hexatriose, and is regarded as polymerized $\alpha\beta$ -hexaamylose. Describe method for preparation of isomaltose by acting upon amylopectin or $\alpha\beta$ -hexaamylose at 50°, with precipitated malt diastase. α -hexaamylose and $\alpha\beta$ -hexaamylose are regarded as basal units of polymerized amylose and amylopectin, respectively, a closed chain structure being assigned to both. Suggest probable formula for the amylophosphoric acid of Northrop and Nel-

Starches and Dextrins, continued.

Components of Starch Granule, continued.

son. Against views of Irvine is cited the effect of steric hindrance on methylation of closed chain compounds, different products obtained by hydrolysis of amylose and amylopectin, and presence of hemicelluloses in rice starches.

Abstract in *Chem. abst.*, 1924, v. 17, p. 79; *Chem. Zentr.*, 1924, Bd. 2, p. 313-314.

607. Malfitano, G., and M. CATOIRE. Solubilité et insolubilité de l'amidon. (Académie des sciences, Comptes rendus, 1923, tome 177, p. 1309-1311.) *EO

One percent potato starch paste was heated to 80° and, upon cooling, was found to separate into an upper, clear layer and a lower, cloudy layer, the latter constituting 9/10 of the whole. From an analysis of the ash of the substances obtained from each, conclude that their solubility depends upon the combined anions.

Abstract in *Chem. abst.*, 1924, v. 18, p. 764; *Chem. Zentr.*, 1924, Bd. 1, p. 644.

608. Schryver, S. B., and E. M. THOMAS. The hemicelluloses. 2. The hemicellulose content of starches. (Biochemical journal, Cambridge, 1923, v. 17, p. 497-500.) PPB

The starches were gelatinized, treated 3 times with taka-diastase, filtered after each time, the residue digested with 0.1% NaOH and dissolved in 2-4% NaOH solution, from which the hemicellulose is precipitated by acetic acid. Using 6 starches, the yield varied from practically 0 to 4%. Properties of the hemicellulose are investigated.

Abstract in *Chem. abst.*, 1924, v. 18, p. 402; *Chem. Zentr.*, 1923, Bd. 3, p. 1622.

609. Tiebackx, F. W. Starch. (Abstract.) (Society of Chemical Industry, Journal, London, 1923, v. 42, p. 467A.) PKA

The viscosity of a starch solution is proportional to its content of amylopectin, a H_3PO_4 ester. Heating or long standing of the solution causes hydrolysis of the amylopectin, accompanied by loss of viscosity, and increase in conductivity and in pH value. A possible relation between diastatic activity and the P present in the starch is suggested. — *Chem. abst.*

610. Maige, A. Les différents stades de la condensation amylogène. (Académie des sciences, Comptes rendus, Paris, 1924, tome 178, p. 1998-2000.) *EO

Abstract in *Chem. Zentr.*, 1924, Bd. 2, p. 679.

611. Pringsheim, Hans, and KURT WOLFSOHN. Über den verschiedenen Aufbau der beiden Stärke-Bestandteile. (Beiträge zur Chemie der Stärke, 10.) (Deutsche chem-

ische Gesellschaft, Berichte, Berlin, 1924, Jahrg. 57, p. 887-891.) PKA

Amylopectin (1) and amylose (2), separated by the method of Ling and Nanji (*entry 606*), are separately depolymerized by acetylation with acetic anhydride and sulphuric acid and also by heating to 200° with glycerol. The molecular weights of the acetates are determined by freezing point in phenol and of the products of the second method by freezing point in water. Results in each case indicate that the elementary body of (1) is composed of 3 glucose residues and of (2), 2 glucose residues.

Abstract in *Chem. abst.*, 1924, v. 18, p. 3046; *Jour. chem. soc.*, 1924, v. 126, part 1, p. 714; *Chem. Zentr.*, 1924, Bd. 2, p. 315.

612. Pringsheim, Hans, and others. Über die Konstitution der Stärke, des Glykogens und der Flechtenstärke. (Beiträge zur Chemie der Stärke, 12.) Von Hans Pringsheim mit A. Beiser, K. Wolfsohn, W. Kusenack, und J. Leibowitz. (Deutsche chemische Gesellschaft, Berichte, Berlin, 1924, v. 57, p. 1581-1598.) PKA

By the action of cold concentrated HCl, amylose and amylopectin are converted, respectively, into the reducing saccharides amylobiose and amylotriose. The residual dextrin of diastatic hydrolysis is identified as trihexosan, present in the amylopectin. Amylose is shown to be identical with the iso-lichenin obtained from Iceland moss; while glycogen is shown to be identical with amylopectin. Enzymic liquefaction and saccharification of starch is accompanied by a depolymerization of starch to the non-reducing hexosans, the enzyme complex effecting this is termed amylobiase. Note that maltose is slowly hydrolyzed to glucose at the acidity, pH4.5, which is optimal for malt amylase. Special significance is attached to the fermentative conversion of amylobiose to maltose. Give a detailed presentation of probable structural formulae and mechanism of transformations of all the compounds mentioned.

Abstract in *Chem. abst.*, 1925, v. 19, p. 974-976; *Jour. chem. soc.*, 1924, v. 126, part 1, p. 1170-1171; *Chem. Zentr.*, 1924, Bd. 2, p. 2243-2245.

613. Samec, Max, and others. Studien über Pflanzenkolloide. 15. Über die aus verschiedenen Stärkearten dargestellten Amylopektine. Von M. Samec, M. Minaeff und N. Ronžin. (Kolloidchemische Beihefte, Dresden-Blasewitz, 1924, Bd. 19, p. 203-212.) PKA

Separate amylopectins from various starches by electrodialysis and find considerable differences in their physical and chemical properties; these differences are not affected by washing with HCl. The amylopectins of roots and tubers may be differentiated from those of seeds. Synthetic amylopectins, prepared from the vari-

Starches and Dextrins, continued.

Components of Starch Granule, continued.

ous starches, show a close similarity in P content and acidity.

Abstract in *Chem. abst.*, 1924, v. 18, p. 2975; *Jour. chem. soc.*, 1924, v. 126, part 1, p. 923; *Chem. Zentr.*, 1924, Bd. 2, p. 443.

614. Sjöberg, Knut. Über einige neue Produkte der enzymatischen Spaltung der Stärke. (Deutsche chemische Gesellschaft, Berichte, Berlin, 1924, Jahrg. 57, p. 1251-1256.) **PKA**

Amylose and amylopectin, separated by the method of Gatin-Gruzewska, are subjected to the action of undialyzed malt amylase for 24 hours and upon precipitation with alcohol, a dihexosan (1) and trihexosan (2), respectively, are obtained. Upon treatment of (1) with MeI and Ag₂O obtains the tetramethyl ether, which is hydrolyzed to 2-3 dimethyl glucose. Prepares hexaacetyl derivative of (1) and nonacetyl derivative of (2).

Abstract in *Chem. abst.*, 1925, v. 19, p. 304; *Jour. chem. soc.*, 1924, v. 126, part 1, p. 1169; *Chem. Zentr.*, 1924, Bd. 2, p. 2394.

615. Sjöberg, Knut, and ELSA ERIKSSON. Nachtrag zu der Mitteilung: Über Amylase. (Zeitschrift für physiologische Chemie, Hoppe-Seyler's, Berlin und Leipzig, 1924, Bd. 142, p. 215-216.) **PKA**

Since the normality of the substrate could not be taken into consideration, the equal inhibition exerted by maltose is no proof for the assumption that amylopectin and amylose are hydrolyzed by one and the same enzyme. — *Chem. abst.*

Abstract in *Chem. Zentr.*, 1925, Bd. 1, p. 1743.

616. Ling, Arthur R., and DINSHAW R. NANJ. Studies on starch; 2. The constitution of polymerised amylose, amylopectin, and their derivatives. (Chemical Society of London, Journal, 1925, v. 127, p. 629-636.) **PKA**

Abstract in *Chem. abst.*, 1925, v. 19, p. 1968; *Chem. Zentr.*, 1925, Bd. 2, p. 646-647.

617. — Studies on starch; 4. The nature of the amylohemiacellulose constituent of certain starches. (Chemical Society of London, Journal, 1925, v. 127, p. 652-656.) **PKA**

Abstract in *Chem. abst.*, 1925, v. 19, p. 1698; *Chem. Zentr.*, 1925, Bd. 2, p. 649.

618. Malfitano, G., and M. CATOIRE. Les micelles d'amidon sont-elles des complexes à plusieurs degrés d'amyloso-phosphates et d'amyloso-silicates alcalino-terreux? (Société chimique de France, Bulletin, Paris, 1925, série 4, tome 37, p. 1014-1027.) **PKA**

Abstract in *Chem. Zentr.*, 1925, Bd. 2, p. 2279.

619. Rask, Olaf S., and ISAAC K. PHELPS. Extraction and estimation of lipoids in cereal products. (Industrial and engineering

chemistry, Easton, 1925, v. 17, p. 187-189.)

† **VOA**

By the use of an ammoniacal alcohol solution the ether-soluble material combined with starch is separated and extracted.

620. Rosenthaler, L. Über Verseifungszahlen von Stärkearten. (Pharmazeutische Zentralhalle, Dresden-Blasewitz, 1925, Jahrg. 66, p. 631.)

Available in Library of Columbia College of Pharmacy.

The following values were obtained by heating 1 gr. of the sample for 1 hour with 20 gr. alcohol and 5 c.c. of 0.1N alcoholic alkali in connection with a reflux, thereupon titrating the unexpended alkali with 0.1N acid to a permanently colorless solution: wheat starch 5.1, rice 4.9, maranta 3.3, potato 4.7, corn 3.2, sago 5.3. It is believed these figures are true saponification values depending on the saponification of amylopectin, an ester of H₃PO₄. — *Chem. abst.*

621. Samec, Max. Sur l'hydrolyse enzymatique des amylophosphates naturels et synthétiques. (Académie des sciences, Comptes rendus, Paris, 1925, tome 181, p. 532-533.) ***EO**

Abstract in *Chem. abst.*, 1926, v. 20, p. 428.

622. — Stöchiometrie der Amylopektine. (Auszug.) (Chemisches Zentralblatt, Leipzig und Berlin, 1925, Bd. 1, p. 731.) **PKA**

Also abstracted in *Chem. abst.*, 1925, v. 19, p. 3094.

623. Samec, Max, and R. KLEMEN. Studien über Pflanzenkolloide. 16. Verhalten der Stärkekomponenten zu Jod und ihre kolloide Schutzwirkung. (Kolloidchemische Beihefte, Dresden und Leipzig, 1925, Bd. 21, p. 55-77.) **PKA**

Abstract in *Chem. abst.*, 1926, v. 20, p. 1534.

624. Syniewski, Wiktor. Action of alpha-diastase on the so-called amylopectin. (Abstract.) (Chemical abstracts, Easton, 1925, v. 19, p. 2502.) **PKA**

625. Taylor, T. Clinton, and H. A. IDDLIS. Separation of the amyloses in some common starches. New York City, 1925. 24 p. 8°. (Columbia dissertation, 1925.)

PKR p.v.73, no.2

The starches were purified by treatment with alcoholic HCl, gelatinized by stirring with NH₄CNS solution, and precipitated with 95% alcohol. Suspensions of the starches were filtered through collodion membranes under a pressure of 4 cm. Hg. The β-amyloses appearing in the filtrate gave a pure blue I coloration, contained only carbohydrate material, did not reduce Fehling's solution and exhibited an α_D=182-188°, which was practically constant for all fractions of the filtrate. Starch suspensions

Starches and Dextrins, continued.

Components of Starch Granule, continued.

were further subjected to the action of a 110-volt direct current and the insoluble α -amyloses which migrated to the positive pole were purified by dialysis and further electrophoresis and in the case of corn and rice starches, shown to contain about 2% fat. Results obtained by ultrafiltration and electro dialysis are in close agreement and show that in corn starch the ratio of α - to β -amylose is approximately 15:85. Heat gelatinization yielded the same results as gelatinization by NH_4CNS .

Reprinted in *Industrial and engineering chemistry*, Easton, 1926, v. 18, p. 713-717, $\dagger$ VOA.

626. Taylor, T. Clinton, and LEO LEHRMAN. The unsaturated fatty acids associated with corn starch. (Columbia thesis, 1925.)

Qualitative determinations were carried

out on the fatty material obtained during acid hydrolysis of corn starch on a plant scale. The solid Mg soap of the palmitic acid was prepared and the unsaturated constituents separated by filtration; these latter components were identified as oleic and linolic acids by means of their oxidation products. Linolic acid was further identified by precipitation of the tetrabromide and oleic acid by its behavior towards N_2O_5 . Several experiments indicated the absence of substances other than these 3 fatty acids. From I numbers obtained before and after removal of palmitic acid, a quantitative relation of the acids was calculated; the experiments in this case were carried out on fat obtained by hydrolysis of starch in the laboratory.

Also in *American Chemical Society, Journal*, Easton, 1926, v. 48, p. 1739-1743, PKA.

CRYSTALLINE DEXTRINS FORMED BY BACTERIAL DEGRADATION OF STARCH

627. Schardinger, Franz. Über die Bildung krystallisierter, Fehlingsche Lösung nicht reduzierender Körper (Polysaccharide) aus Stärke durch mikrobielle Tätigkeit. (Centralblatt für Bakteriologie, Parasitenkunde und Infektionskrankheiten, Abteilung 2, Jena, 1908, Bd. 22, p. 98-103.) QDA

The action of *Bacillus macerans* affects the solution of various starches and from the resulting products crystalline compounds are obtained. The substances termed "crystallised amyloextrin" and "crystallised amylose" do not reduce Fehling's solution and are not fermentable by yeast.

Abstract in *Jour. soc. chem. ind.*, 1909, v. 28, p. 153; *Chem. abst.*, 1909, v. 3, p. 910; *Jour. chem. soc.*, 1909, v. 96, part 2, p. 82; *Chem. Zentr.*, 1909, Bd. 1, p. 68.

628. — Bildung krystallisierter Polysaccharide (Dextrine) aus Stärkekleister durch Mikroben. (Centralblatt für Bakteriologie, Parasitenkunde und Infektionskrankheiten, Abteilung 2, Jena, 1911, Bd. 29, p. 188-197.) QDA

The action of *B. Macerans* varies with the origin of the starch. Four starches were acted upon and two non-reducing, unfermentable, crystalline dextrins were obtained in each case, these α and β modifications having $\alpha_D = 128^\circ$ and $\alpha_D = 136^\circ$ respectively.

Abstract in *Chem. abst.*, 1911, v. 5, p. 2575; *Jour. chem. soc.*, 1911, v. 100, part 1, p. 181; *Jour. soc. chem. ind.*, 1911, v. 30, p. 439; *Chem. Zentr.*, 1911, Bd. 1, p. 874.

629. Pringsheim, Hans, and ALFRED LANG-HANS. Beiträge zur Chemie der Stärke. 1. Über krystallisierte Polysaccharide aus Stärke. (Deutsche chemische Gesellschaft, Berichte, Berlin, 1912, Jahrg. 45, p. 2533-2546.) PKA

The term "amylose" is applied to the

($\text{C}_6\text{H}_{10}\text{O}_5$) grouping. The α and β dextrins, produced by action of *B. Macerans* (entry 628), are termed respectively tetra- and hexa-(?)amylose. Acetylation involves a preliminary scission of the molecule with formation of a crystalline hexaacetate of diamylose and a nonaacetate of triamylose, respectively. These are hydrolyzed yielding the crystalline non-reducing dextrins, di- and tri-amylose, which possess a distinctly sweet taste and yield glucose on acid hydrolysis.

Abstract in *Jour. chem. soc.*, 1912, v. 102, part 1, p. 832; *Jour. soc. chem. ind.*, 1912, v. 31, p. 1001; *Chem. abst.*, 1912, v. 7, p. 345; *Chem. Zentr.*, 1912, Bd. 2, p. 1433-1435; *Bull. assoc. chimistes*, 1912-13, tome 30, p. 374; *Bull. soc. chim. Paris*, 1913, série 4, tome 14, p. 182-183.

630. Pringsheim, Hans, and FRANZ EISSLER. Beiträge zur Chemie der Stärke. (Über Schardingers krystallisierte Dextrine. 2.) (Deutsche chemische Gesellschaft, Berichte, Berlin, 1913, Jahrg. 46, p. 2959-2974.) PKA

Show that a third crystalline dextrin is formed from starch by the action of *B. Macerans*.

Prepare and describe dibenzoate of diamylose, tribenzoate of triamylose, tetraamylose iodide, hexaamylose, diiodide, isodiamylose, isotriamylose, isodiamylose hexa-acetate, and isotriamylose nona-acetate. Prepare reducing substances by successive acetylations of soluble starch. Find that *B. Macerans* acts on the amylose and amylopectin of Maquenne and Roux, producing dextrins α and β from both in approximately the same proportions. Determine action of yeast and of various enzymes on the six amyloses.

Abstract in *Chem. abst.*, 1914, v. 8, p. 118-119; *Chem. Zentr.*, 1913, Bd. 2, p. 1791-1794; *Jour. chem. soc.*, 1913, v. 104, part 1, p. 1156-1157; *Jour. soc. chem. ind.*, 1913, v. 32, p. 985; *Bull. assoc. chimistes*, 1913-14, tome 31, p. 531; *Bull. soc. chim. Paris*, 1914, série 4, tome 16, p. 25.

Starches and Dextrins, continued.

Crystalline Dextrins Formed by Bacterial Degradation of Starch, continued.

631. — Beiträge zur Chemie der Stärke. 3. (Deutsche chemische Gesellschaft, Berichte, Berlin, 1914, Jahrg. 47, p. 2565-2572.)

PKA

From the crystalline dextrins formed by action of *B. Macerans* on rice starch, have obtained a new crystalline dextrin, α -hexaamylose and a slime which appears to be an octaamylose. There are now 4 known dextrins of the α series and 2 of the β series. By heating in glycerol, effect the transformation of α -tetraamylose into β -triomylose. Members of the α and β series are differentiated by the color and form of their crystalline Br and I compounds; 9 of these compounds are prepared and described.

Abstract in *Jour. chem. soc.*, 1915, v. 108, part 1, p. 382; *Chem. abst.*, 1915, v. 9, p. 83; *Bull. soc. chim. France*, 1916, série 4, tome 20, p. 552.

632. Pringsheim, Hans. Neue Ergebnisse der Stärkechemie. (Naturwissenschaften, Berlin, 1915, Jahrg. 3, p. 95-99.)

OA

Discussion of the properties and probable constitution of the amyloses formed by action of *B. Macerans* on starch.

633. Pringsheim, Hans, and STEFANIE LICHTENSTEIN. Über krystallisierte Polysaccharide aus Glykogen. (Deutsche chemische Gesellschaft, Berichte, Berlin, 1916, Jahrg. 49, p. 364-369.)

PKA

Fermentation of glycogen with *B. Macerans* yields the same products as starch, although in different proportions.

634. Karrer, Paul, and C. NÄGELI. Polysaccharide. 2. Zur Konstitution der Diamylose. (Helvetica chimica acta, Basileae and Genevae, 1921, v. 4, p. 169-173.)

PKA

α -tetraamylose, when treated with acetyl bromide, is converted first into acetylated α -diamylose and then into acetobromomaltose. The latter is identified by conversion to heptacetyl maltose and subsequently to maltose. α -diamylose is thus shown to be an anhydride of maltose.

Abstract in *Chem. abst.*, 1921, v. 15, p. 2072; *Chem. Zentr.*, 1921, Bd. 1, p. 891; *Bull. soc. chim. France*, 1921, série 4, tome 30, p. 1167.

635. — Polysaccharide 6. Die Konstitution der Stärke und des Glykogens. (Helvetica chimica acta, Basileae and Genevae, 1921, v. 4, p. 263-269.)

PKA

Potato starch when treated with acetyl bromide yields acetylbromomaltose, the reaction following the same course as when diamylose or other α -amyloses are similarly treated. As normal glucosidic linkages are resistant to this reagent, conclude that only α -1,4 dextrose groupings are connected although normal linkages. Cite evidence that

starch is a polymer of maltose anhydride, i.e. α -diamylose. Show that glycogen is of the same constitution but of a different degree of polymerization.

Abstract in *Chem. abst.*, 1922, v. 16, p. 63; *Jour. chem. soc.*, 1921, v. 120, part 1, p. 313; *Chem. Zentr.*, 1921, Bd. 1, p. 936; *Bull. soc. chim. Paris*, 1921, série 4, tome 30, p. 1172-1173.

636. Karrer, Paul, and others. Polysaccharide. 8. Zur Kenntnis der Stärke und der Amylosen. Von P. Karrer, C. Nægeli, O. Hurwitz und W. Wälti. (Helvetica chimica acta, Basileae et Genevae, 1921, v. 4, p. 678-699.)

PKA

The similarity of starch and the amyloses is shown by their behavior towards acetyl bromide, iodine, alkali hydroxides, and enzymes, by behavior upon distillation in vacuo, by heats of combustion, by composition of baryta compounds and by molecular weights. Determine molecular weight of methylated wheat, rice and maize starches.

Abstract in *Jour. chem. soc.*, 1921, v. 120, part 1, p. 768-769; *Chem. abst.*, 1922, v. 16, p. 64; *Chem. Zentr.*, 1922, Bd. 1, p. 320-321; *Bull. soc. chim. France*, 1922, série 4, tome 32, p. 245-248.

637. Karrer, Paul. Polysaccharide xi. Die Verbindungen der Anhydrozucker mit Alkalilagen. Eine Methode zur Bestimmung der Grundkörper polymerer Anhydrozucker. (Helvetica chimica acta, Basileae and Genevae, 1921, v. 4, p. 811-816.)

PKA

Obtains alkali addition compounds of the amyloses corresponding exactly to the empirical formula, $C_{12}H_{20}O_{10}$. NaOH. From an alkaline solution of Zulkowski's soluble starch, precipitates a compound with the same empirical formula. Believes that starch is a crystalline substance, the lattice points of which are occupied by double or triple diamylose complexes.

Abstract in *Jour. chem. soc.*, 1921, v. 120, part 1, p. 765; *Chem. Zentr.*, 1922, Bd. 1, p. 405; *Chem. abst.*, 1922, v. 16, p. 65; *Bull. soc. chim. France*, 1922, série 4, tome 32, p. 457.

638. Pringsheim, Hans, and WALTER PERSCH. Über die Methylierung der "Polyamylosen." (Beiträge zur Chemie der Stärke, 4.) (Deutsche chemische Gesellschaft, Berichte, Berlin, 1921, Jahrg. 54, p. 3162-3168.)

PKA

Tetraamylose is partially methylated by treatment with methyl sulphate and NaOH and the resulting non-homogeneous product is further treated with methyl iodide and silver oxide yielding a crystalline substance, which contains 2 methoxyl groups for each dextrose residue. The product is regarded as an octomethyltetraamylose. Have obtained a new tetraamylose, which is characterized by its crystalline carbon disulphide addition compound.

Abstract in *Chem. abst.*, 1922, v. 16, p. 1745; *Jour. chem. soc.*, 1922, v. 122, part 1, p. 113; *Chem. Zentr.*, 1922, Bd. 1, p. 321.

Starches and Dextrins, continued.

Crystalline Dextrins Formed by Bacterial Degradation of Starch, continued.

639. Karrer, Paul, and others. Polysaccharide 13. Zur Kenntnis des Inulins und der Alkalihydroxydverbindungen der Anhydrozucker. Von P. Karrer, Max Staub und A. Wälti. (*Helvetica chimica acta*, Basileae et Genevae, 1922, v. 5, p. 129-139.)

PKA

Prepare KOH compounds of α -diamylose, α -tetraamylose, β -hexaamylose and α -octaamylose. The products contained 1 molecule KOH per molecule of anhydromaltose.

Abstract in *Chem. abst.*, 1922, v. 16, p. 1746; *Chem. Zentr.*, 1922, Bd. 3, p. 600; *Bull. soc. chim. France*, 1922, série 4, tome 32, p. 1247-1249.

640. Karrer, Paul, and ELISABETH BÜRKLIN. Polysaccharide. 14. Zur Kenntnis der Amylosen. (*Helvetica chimica acta*, Basileae et Genevae, 1922, v. 5, p. 181-187.)

PKA

The "triamylose" of Pringsheim, upon acetylation, is shown to be a polymerized form of a disaccharose anhydride. Also, that it is identical with β -hexaamylose is shown by the NaOH compound, resistance to pancreatic enzymes, water of crystallization, water solubility, specific rotation and crystalline form. The fact that β -hexaamylose is not depolymerized by acetylation with acetic anhydride and zinc chloride is of significance in the acetylation of starch.

Abstract in *Chem. abst.*, 1922, v. 16, p. 1746; *Jour. chem. soc.*, 1922, v. 122, part 1, p. 435; *Chem. Zentr.*, 1922, Bd. 3, p. 601.

641. Karrer, Paul, and A. P. SMIRNOFF. Polysaccharide. 15. Die Konstitution der Diamylose und des der Cellulose zu Grunde liegenden Anhydrozuckers (Cellosan). (*Helvetica chimica acta*, Basileae et Genevae, 1922, v. 5, p. 187-201.)

PKA

Note that acetylated diamylose and starch are acted upon to give aceto-1:6-dibromoglucose unaccompanied by any monobromoderivative. Diamylose is considered to be the 1-12 anhydride.

Abstract in *Chem. abst.*, 1922, v. 16, p. 1747; *Jour. chem. soc.*, 1922, v. 122, part 1, p. 435; *Chem. Zentr.*, 1922, Bd. 3, p. 601.

642. Karrer, Paul. Polysaccharide (XVI. Mitteilung.) (Experimentell mitbearbeitet von W. Fioroni.) (*Deutsche chemische Gesellschaft, Berichte*, Berlin, 1922, Jahrg. 55, p. 2854-2863.)

PKA

Evidence drawn from the heats of combustion of the amyloses, of starch and of starch hexa-acetate, indicates that the acetylation of starch does not alter the degree of polymerization. Replying to Pringsheim, maintains that triamylose and β -hexaamylose are identical.

Abstract in *Jour. chem. soc.*, 1922, v. 122, part 1, p. 1119; *Chem. abst.*, 1923, v. 17, p. 987; *Chem.*

Zentr., 1922, Bd. 3, p. 1123; *Bull. soc. chim. France*, 1923, série 4, tome 34, p. 50.

643. — Untersuchungen über polymere Kohlenhydrate. (*Zeitschrift für angewandte Chemie*, Leipzig, 1922, Jahrg. 35, p. 85-90.)

PKA

Treats briefly the work of Pringsheim on starch and the amyloses. In a review of the author's work discusses methylation, acetyl bromide decompositions, alkali compounds, iodine reactions, barium hydroxide precipitates, vacuum distillation, action of enzymes and heats of combustion of starch and the amyloses. The evidence is that starch is a polymerized maltose anhydride, with probably not more than 3 maltose residues in the molecule.

644. Pringsheim, Hans, and WALTER PERSCH. Über Methyl und Acetylprodukte der "Polyamylosen." (*Beiträge zur Chemie der Stärke*, 5.) (*Deutsche chemische Gesellschaft, Berichte*, 1922, Jahrg. 55, p. 1425-1433.)

PKA

Octamethyltetraamylose, although resistant to further methylation, is converted into its corresponding tetraacetate upon treatment with acetic anhydride and pyridine. Diamylose is converted into tetramethyl-diamylose by the successive actions of methyl sulphate and NaOH and of methyl iodide and silver oxide. Methylation of the polyamyloses of the β series results in the production of reducing substances, even if an acid reaction is avoided. By acetylation and subsequent saponification, the previously mentioned slime is shown to be α -hexaamylose.

Abstract in *Chem. abst.*, 1922, v. 16, p. 3875; *Jour. chem. soc.*, 1922, v. 122, part 1, p. 632; *Chem. Zentr.*, 1922, Bd. 3, p. 759; *Bull. soc. chim. France*, 1922, série 4, tome 32, p. 1559-1560.

645. Pringsheim, Hans, and DIAMANDI DERNIKOS. Weiteres über die Polyamylosen. (*Beiträge zur Chemie der Stärke*, 6.) (*Deutsche chemische Gesellschaft, Berichte*, Berlin, 1922, Jahrg. 55, p. 1433-1445.)

PKA

α -tetraamylose is converted by acetic acid and pyridine into the dodecaacetate and is regenerated upon saponification with KOH. Characterization of the compounds is based upon a determination of molecular weights. Acetylation of β -hexaamylose by this method results in depolymerization. The identity of α -hexaamylose and triamylose, as claimed by Karrer, is vigorously refuted. With the exception of possible crystallographic identity, all other points of identity are disputed. Give crystal measurements of 5 polyamyloses.

Abstract in *Chem. abst.*, 1922, v. 16, p. 3876; *Jour. chem. soc.*, 1922, v. 122, part 1, p. 632; *Chem. Zentr.*, 1922, Bd. 3, p. 760; *Bull. soc. chim. France*, 1922, série 4, tome 32, p. 1560.

*Starches and Dextrins, continued.**Crystalline Dextrins Formed by Bacterial Degradation of Starch, continued.*

646. Pringsheim, Hans, and KURT GOLDSTEIN. Zur Charakterisierung der "Polyamylosen." (Beiträge zur Chemie der Stärke, 8.) (Deutsche chemische Gesellschaft, Berichte, 1923, Jahrg. 56, p. 1520-1526.) **PKA**

That β hexaamylose (1) is a dimer of triamylose (2) and α hexaamylose a trimer of diamylose is further confirmed by determinations of their molecular weights of their methylation products. The methylated products of (1) and (2) are shown to possess different crystalline forms. The phosphoric esters of (1) and of α tetraamylose were prepared by treatment with phosphoryl chloride in the presence of pyridine; the products are gelatinous substances and appear to contain one phosphoric acid residue for each dextrose residue. Have obtained di- and tetra-benzoyl-diamylose and tri- and hexa-benzoyl-triamylose by benzylation of tetraamylose and (1) respectively.

Abstract in *Chem. abst.*, 1924, v. 18, p. 80; *Jour. chem. soc.*, 1923, v. 124, part 1, p. 899; *Chem. Zentr.*, 1923, Bd. 3, p. 611; *Bull. soc. chim. France*, 1923, série 4, tome 34, p. 1923.

647. Irvine, James C., and others. The constitution of polysaccharides, 8. The molecular structure of β -hexaamylose. By J. C. Irvine, Hans Pringsheim, and John MacDonald. (Chemical Society of London, Journal, 1924, v. 125, p. 942-947.) **PKA**

β -hexaamylose is treated 22 times with methyl sulphate and NaOH. Upon removal of an unknown impurity by extraction with petroleum ether, and crystallization of the residue from ethyl ether, they obtain plates of β -hexa (trimethylamylose), molecular weight in camphor, 1200. The molecular weight is taken as conclusive evidence against the identity of β -hexaamylose and triamylose. The methylated product is hy-

drolyzed, almost exclusively, to 2-3-6 trimethyl glucose.

Abstract in *Chem. abst.*, 1924, v. 18, p. 2134; *Chem. Zentr.*, 1924, Jahrg. 95, Bd. 2, p. 622.

648. Pringsheim, Hans, and JESAITA LEIBOWITZ. Über die Konstitution der Polyamylosen. (Beiträge zur Chemie der Stärke, 9.) (Deutsche chemische Gesellschaft, Berichte, 1924, Jahrg. 57, p. 884-887.) **PKA**

By treatment of α tetraamylose or β hexaamylose with cold concentrated HCl, have obtained a new disaccharide, $C_{12}H_{22}O_{11}$, which forms an osazone, is hydrolyzed by amylase but is not by maltase or emulsin, is considered to be a glucosido-3-glucose and is termed amylobiose. Show that the compound differs from the acid reversion product of glucose. Give probable structural formula for diamylose.

Abstract in *Chem. abst.*, 1924, v. 18, p. 3046; *Jour. soc. chem. ind.*, 1924, v. 43, p. 530B; *Chem. Zentr.*, 1924, Bd. 2, p. 315.

649. Pringsheim, Hans, and ARNOLD STEINGROEVE. Über die Halogenverbindungen der Polyamylosen. (Beiträge zur Chemie der Stärke, 11.) (Deutsche chemische Gesellschaft, Berichte, Berlin, 1924, Jahrg. 57, p. 1579-1581.) **PKA**

Determine free and total halogen in a number of the Br and I additive compounds of the polyamyloses; results show the polyamyloses, like starch, combine with considerable amounts of halide. Note a difference in the triamylose and the β hexaamylose Br products.

Abstract in *Chem. abst.*, 1925, v. 19, p. 974; *Jour. chem. soc.*, 1924, v. 126, part 1, p. 1170; *Chem. Zentr.*, 1924, Bd. 2, p. 2243.

650. Pringsheim, Hans, and others. Über Salpetersäure-Ester der Polyamylosen. (Beiträge zur Chemie der Stärke, 14.) Von H. Pringsheim, Jesaia Leibowitz und S. H. Silmann. (Deutsche chemische Gesellschaft, Berichte, Berlin, 1925, Jahrg. 58, p. 1889-1893.) **PKA**

Abstract in *Chem. abst.*, 1926, v. 20, p. 380.

GENERAL CHEMICAL CHARACTERISTICS

651. Vincent. Prussian blue and starch. (Abstract.) (Philosophical magazine, London, 1819, v. 53, p. 69.) **OA**

Finds that starch is converted into a kind of gum when boiled with Prussian blue.

652. Doebereiner. Neue Art von künstlicher Bildung der Ameisensäure. (Annalen der Physik und Chemie, Poggendorff's, Leipzig, 1829, Bd. 15, p. 307-309.) **PAA**

When starch is distilled with H_2SO_4 and MnO_2 there is a notable evolution of CO_2 and formic acid may be identified as the principal constituent of the distillate.

652A. Payen, A., and J. PERSOZ. Mémoire sur l'amidone (substance intérieure de la fécule) et suite de Recherches sur la diastase. (Annales de chimie et de physique, Paris, 1834, tome 56, p. 337-371.) **PAA**

Study action of water, alcohol, tannin, iodine, baryta water and diastase on starch. Reviewed in *Philosophical magazine*, London, 1837, v. 10, p. 247.

Reprint in *Jour. prakt. Chem.*, 1835, Bd. 4, p. 288-313.

652B. Fontanello, Julia. Ueber die Anwesenheit des Stärkemehls in einer gekeimten Gerste, die über 3000 Jahre gelegen

Starches and Dextrins, continued.

General Chemical Characteristics, continued.

hatte. (Annalen der Pharmacie, Liebig's, Heidelberg, 1835, Bd. 14, p. 297-298.) **PKA**

Barley grains, which had been stored with an Egyptian mummy for 30 centuries, were shown to contain starch.

653. Guibort. Sur la fécule. (L'Institut, Paris, 1835, année 3, p. 6.)

Available in Library of the Engineering Societies.

Abstract in *Jour. prakt. Chem.*, Erdmann's, 1835, Bd. 4, p. 148.

654. Jacquelin. Étude des phénomènes que présente la fécule hydratée soumise en vases clos à des températures constantes. (Académie des sciences, Comptes rendus, Paris, 1839, tome 8, p. 916-918.) ***EO**

655. Kalinowsky, J. von. Ueber die Einwirkung des Gerbstoffes auf die Stärke. (Journal für praktische Chemie, Leipzig, 1845, Bd. 35, p. 201-203.) **PKA**

Tannin is added to starch solution and the resulting precipitate analyzed. Concludes that there is no combination of the starch and tannic acid.

656. Staedeler, A. Ueber die Bildung des Chlorals aus Stärke und ein neues Zersetzungsproduct desselben. (Annalen der Chemie und Pharmacie, Liebig's, Heidelberg, 1847, Bd. 61, p. 101-121.) **PKA**

Notes that when starch is distilled with manganese peroxide and HCl notable quantities of chloral and formic acid are formed.

657. Schoenbein. Über die Einwirkung des Lichts auf Jodbleistärke. (Annalen der Physik und Chemie, Poggendorff's, Leipzig, 1848, Bd. 73, p. 136.) **PAA**

The compound is prepared by adding iodine and lead nitrate to a starch paste.

658. Masche, O. Einige Beobachtungen über lösliches und unlösliches Amylon, über Moosstärke und Leicom. (Journal für praktische Chemie, Leipzig, 1854, Bd. 61, p. 1-10.) **PKA**

Abstract in *Jahresber. Chem.*, 1854, p. 621.

659. Cramer, C. Über das Verhalten des Kupferoxydammoniaks zur Pflanzenzellmembran, zu Stärke, Inulin, zum Zellenkern und zum Primordialschlauch. (Journal für praktische Chemie, Leipzig, 1858, Bd. 73, p. 1-18.) **PKA**

660. Niepce. Action de la lumière sur l'amidon ou la dextrine. (Société chimique

de Paris, Répertoire de chimie appliquée, 1858-59, tome 1, p. 349-350.) **PKA**

Starch or dextrin, when exposed to light, forms a certain amount of glucose, depending on the length of exposure. As most French papers are sized with starch and as AgNO₃ is easily reduced by glucose, it is apparent why a paper dipped in AgNO₃ is able to give a photographic test.

661. Payen, A. Amidon et cellulose. Observations sur des analogies remarquables et des différences caractéristiques entre ces deux principes immédiats. (Académie des sciences, Comptes rendus, Paris, 1859, tome 48, p. 67-75.) ***EO**

Starch grains, when treated with cuprammonium, swell to several times their original volume, forming an insoluble compound which contains about 12% copper oxide after having been washed with water and dried. When washed with ammonia the Cu content decreases gradually and the starch dissolves.

Condensed in *Société chimique de Paris, Répertoire de chimie pure*, 1858-59, tome 1, p. 233-234.

Abstract in *Jahresber. Chem.*, 1859, p. 545-547.

662. Niepce, and L. Corvisart. De la fécule végétale et animale sous le rapport de l'influence transformatrice qu'exerce sur elle la lumière solaire; de la dextrine, du sucre de canne, de l'acid oxalique sous le même rapport; de quelques substances qui annihilent ou accroissent cette action solaire. (Académie des sciences, Comptes rendus, Paris, 1859, tome 49, p. 368-371.) ***EO**

Reprint in *Jour. prakt. Chem.*, 1860, Bd. 80, p. 177-180.

663. Payen, A. Observations sur les tissus végétaux, nouveau caractère distinctif entre la cellulose et l'amidon. (Académie des sciences, Comptes rendus, Paris, 1859, tome 48, p. 319-325.) ***EO**

Discussion by M. Fremy and reply by M. Payen, *ibid.*, p. 325-327.

664. — Dextrine et glucose produites sous l'influence des acides sulfurique ou chlorhydrique; de la diastase ou de la diastase et de la levûre; cellulose fibreuse extraite des bois; glucose incristallisable préparée au moyen du malt ou de l'acide sulfurique. (Extrait.) (Académie des sciences, Comptes rendus, Paris, 1861, tome 53, p. 1217-1223.) ***EO**

Determines yield of glucose under various conditions. Concludes that HCl effects the highest per cent conversion. The residual dextrin of enzymic hydrolysis, after separation from the saccharification products, is readily saccharified by diastase but is not fermented by beer yeast. Starch cannot be

*Starches and Dextrins, continued.**General Chemical Characteristics, continued.*

converted into dextrin without the formation of sugar. Diastase will act at temperatures as low as -5° .

Following remarks of Chevreul, *ibid.*, p. 1224-1225.

Abstract in *Ding. poly. Jour.*, 1862, Bd. 164, p. 144-149; *Wag. Jahr.*, 1862, Jahrg. 8, p. 403-404; *Jahresber. Chem.*, 1861, p. 717-719.

665. Weiss, Adolph, and JULIUS WIESNER. Über das Verhalten des Kupferoxyd ammoniaks zur Stärke. (Akademie der Wissenschaften, Wien, Sitzungsberichte, Mathematisch-naturwissenschaftliche Classe, 1862, Bd. 46, Abt. 2, p. 311-319.) *EF

666. Kemper, R. Reduction der Kupferlösung durch Dextrin. (Archiv der Pharmacie, Hannover, 1863, Bd. 165, p. 250-252.)

Available in Library of Columbia College of Pharmacy.

Finds that a weak solution of sugar-free dextrin does not reduce Fehling's solution, while a concentrated dextrin solution does exhibit reducing power.

667. Young, J. W. The absorbent power of starch for the coal-tar colours. (Chemical news, London, 1864, v. 9, p. 38.) PKA

Abstract in *Chem. Centr.*, 1864, p. 591; *Polytechnisches Notizblatt*, 1864, Jahrg. 19, p. 256.

668. Starch and sugar. (Scientific American, New York, 1865, new series, v. 12, p. 311.) ††VA

669. Brester, A. Recherches électrolytiques. (Archives néerlandaises des sciences exactes et naturelles, La Haye, 1866, tome 1, p. 296-304.) OA

Notes that a starch solution, which conducted the current of 6 "éléments de Bunsen," still exhibited a neutral reaction at the end of 5 days and was not converted into sugar.

Condensed in *Zeitschrift für Chemie*, 1866, Jahrg. 9, p. 680-683.

670. Loew, O. On the action of water upon "carbohydrates" at an elevated temperature. (American journal of science and arts, Silliman's, New Haven, 1867, series 2, v. 43, p. 371.) OA

Notes that starch and other carbohydrates, when heated with water to 170° for about 5 hours, decomposed with formation of carbon, and formic and carbonic acids.

Abstract in *Zeitschrift für Chemie*, 1867, Jahrg. 10, p. 510; *Bull. soc. chim. Paris*, 1867, nouv. série, tome 8, semestre 2, p. 425.

671. Musculus, Fritz. Sur la dextrine insoluble dans l'eau. (Académie des sciences,

Comptes rendus, Paris, 1870, tome 70, p. 857-859.) *EO

The insoluble dextrin is prepared by acting upon starch with glacial acetic acid, by digesting with amylase to a reddish violet iodine reaction, or by modifying the action of sulphuric acid and water on starch. It is insoluble in cold water but dissolves when heated to 50° and upon cooling is not precipitated.

Abstract in *Chem. news*, 1870, v. 21, p. 201; *Chem. Zentr.*, 1870, p. 307; *Ber.*, 1870, Jahrg. 3, p. 430; *Bull. soc. chim. Paris*, 1870, nouv. série, tome 14, semestre 2, p. 263; *Wag. Jahr.*, 1870, Jahrg. 16, p. 378.

672. Flueckiger F. A. Ueber Stärke und Cellulose. (Archiv der Pharmacie, Halle, 1871, Bd. 146, p. 7-31.)

Available in Library of Columbia College of Pharmacy.

673. Hoppe-Seyler, F. Ueber die Bildung von Brenzcatechin aus Kohlehydraten, besonders Cellulose. (Deutsche chemische Gesellschaft, Berichte, Berlin, 1871, Jahrg. 4, p. 15-16.) PKA

Notes that pyrocatechin is formed by heating starch with water at 200° for 4 to 6 hours in a sealed tube.

Abstract in *Jour. chem. soc.*, 1871, v. 24, p. 226.

674. Schiff, Hugo. Über Anilide von sog. Kohlenhydraten. (Deutsche chemische Gesellschaft, Berichte, Berlin, 1871, Jahrg. 4, p. 908-909.) PKA

Notes that starch was transformed, principally to dextrin, by heating with aniline.

Abstract in *Jour. chem. soc.*, 1872, v. 25, p. 150; *Chem. news*, 1871, v. 24, p. 300; *Jahresber. Chem.*, 1871, p. 798.

675. Lunge, George. Ueber die salpetrigen Gase aus Salpetersäure und Stärke und diejenigen in den Schwefelsäurekammern. (Deutsche chemische Gesellschaft, Berichte, Berlin, 1878, Jahrg. 11, p. 1229-1233.) PKA

Notes that pure nitrogen trioxide is evolved when nitric acid (specific gravity 1.33 at 20°) is added gradually to a thick emulsion of starch heated on a water bath.

Abstract in *Jour. chem. soc.*, 1878, v. 34, p. 833; *Bull. soc. chim. Paris*, 1879, nouv. série, tome 32, semestre 2, p. 132-134; *Jahresber. Chem.*, 1878, p. 219-221.

676. Claesson, Peter. Ueber die Aetherschweifelsäuren der mehrsaurigen Alkohole und der Kohlehydrate nebst einigen Bemerkungen über die Constitution der letzteren. (Journal für praktische Chemie, 1879, Bd. 20, p. 1-34.) PKA

Glucose, dextrin, starch, and cellulose yield dextrosemonochloridtetrasulphuric acid when treated with chlorsulphonic acid.

Abstract in *Ber.*, 1879, Jahrg. 12, p. 2016-2018.

Starches and Dextrins, continued.

General Chemical Characteristics, continued.

677. Eder, Joseph M. Ueber das Verhalten von Leim und Kohlehydraten etc. gegen Chromate unter dem Einflusse des Lichtes. (Journal für praktische Chemie, Leipzig, 1879, N. F., Bd. 19, p. 294-301.) **PKA**

Notes behavior of a mixture of chromates and dextrin under the influence of light.

678. Riban, J. Sur la transformation de l'amidon en glucose par l'eau froide. (Société chimique de Paris, Bulletin, 1879, nouv. série, tome 31, semestre 1, p. 10-11.) **PKA**

A dilute starch solution is prepared and saturated with NaCl. After a year the solution is less sensitive to the I reaction and after 3 to 4 years gives no I coloration. Finds glucose and dextrin present in the ratio 9 to 1.

Abstract in *American journal of science and arts*, 1879, v. 117, p. 404; *Chem. news*, 1879, v. 39, p. 104; *Wag. Jahr.*, 1879, Jahrg. 25, p. 688; *Jahresber. Chem.*, 1879, p. 835.

679. Musculus, Fritz, and ARTHUR MEYER. Ueber Erythrodextrin. (Zeitschrift für physiologische Chemie, Hoppe-Seyler's, Strassburg, 1880, Bd. 4, p. 451-454.) **PKA**

From a study of the iodine colorations conclude that erythrodextrin is a mixture of dextrin and soluble starch.

Abstract in *Wag. Jahr.*, 1880, Jahrg. 26, p. 538.

680. Rechenberg, C. von. Ueber die Verbrennungswärme organischer Verbindungen. (Journal für praktische Chemie, Leipzig, 1880, N. F., Bd. 22, p. 223-250.) **PKA**

Paper includes a calculation of heat evolved in the conversion of starch to maltose by amylase and conversion of starch to dextrose by acids.

Abstract in *Jour. chem. soc.*, 1881, v. 40, p. 10-12.

681. Reichl, C. Neue Reaction auf Gummi. (Auszug.) (Zeitschrift für analytische Chemie, Wiesbaden, 1880, Jahrg. 19, p. 357.) **PKA**

Notes that starch or dextrin develops a yellow coloration when heated with orcin and sulphuric acid; the alkaline solution exhibits a greenish fluorescence.

Also abstracted in *Chemiker-Zeitung*, Cöthen, 1880, Jahrg. 4, p. 191.

682. Stumpf, M. Die chemische Veränderung des Stärkemehls beim Dämpfen unter hohem Druck. (Centralblatt für Agrikulturchemie, Biedermann's, Leipzig, 1880, Jahrg. 9, p. 457-459.)

Available in Library of Department of Agriculture.

Abstract in *Jour. chem. soc.*, 1880, v. 38, p. 834.

683. Thomsen, Th. Ueber Multipla in dem optischen Drehungsvermögen der Kohlehydrate. (Deutsche chemische Gesellschaft, Berichte, Berlin, 1880, p. 2168-2169.) **PKA**

684. Musculus, Fritz, and ARTHUR MEYER. Dextrin aus Traubenzucker. (Zeitschrift für physiologische Chemie, Hoppe-Seyler's, Strassburg, 1881, Bd. 5, p. 122-126.) **PKA**

An attempt to synthesize a dextrin by heating glucose with H_2SO_4 .

Abstract in *Jahresber. Chem.*, 1881, p. 985; *Chem. Centr.*, 1881, p. 315.

685. Soxhlet, F. Die angebliche Verzuckerung der Stärke durch Wasser unter Hochdruck. (Zeitschrift für das gesammte Brauwesen, München und Leipzig, 1881, Jahrg. 4, p. 177-181.)

Available in Library of Chemists' Club.

Finds that the supposed conversion of starch by water at high temperatures and pressures is due to the presence of free acids in the commercial starches employed.

Abstract in *Jour. chem. soc.*, 1882, v. 42, p. 30; *Chem. Centr.*, 1881, p. 661; *Wag. Jahr.*, 1881, Jahrg. 27, p. 819; *Chemiker-Zeitung*, 1882, Jahrg. 5, p. 288.

686. Damm, G., and L. SCHREINER. Ueber Resorcinfarbstoffe. (Deutsche chemische Gesellschaft, Berichte, Berlin, 1882, Jahrg. 15, p. 555-557.) **PKA**

Note that dextrin, when heated with resorcin and $ZnCl_2$, forms a compound which dissolves in alkaline solution with production of a greenish-blue fluorescence.

687. Boehm, Josef. Ueber das Verhalten von vegetabilischen Geweben und von Stärke und Kohle zu Gasen. (Botanische Zeitung, Leipzig, 1883, Jahrg. 41, p. 522-526, 538-551, 554-559.) **QEA**

Notes that dried starch grains absorb 5 to 6 times their volume of CO_2 . The gas is not wholly removable in a vacuum, but completely removable by boiling water. Moist starch grains do not absorb CO_2 .

Abstract in *Chem. Centr.*, 1883, p. 710; *Jahresber. Chem.*, 1883, p. 1388-1389.

688. Franchimont, A. P. N. Sur la cellulose et l'amidon en présence du brome. (Recueil des travaux chimiques des Pays-Bas, Leide, 1883, tome 2, p. 91-92.) **PKA**

Notes that in the complete absence of moisture there is no combination between starch and bromine. In the presence of a trace of moisture, the products formed contain variable amounts of Br and HBr.

Abstract in *Chem. Centr.*, 1883, p. 514.

689. Marciano, V. Sur la panification. (Académie des sciences, Comptes rendus, Paris, 1883, tome 96, p. 1733-1734.) ***EO**

Contrary to observations of Chicandard, finds that at commencement of fermenta-

*Starches and Dextrins, continued.**General Chemical Characteristics, continued.*

tion the bread contains a considerable proportion of erythro-dextrins and a relatively small quantity of soluble starch, while at a later stage it also contained a notable proportion of achroo-dextrins.

Abstract in *Jour. chem. soc.*, 1884, v. 46, p. 132; *Chem. Centr.*, 1883, p. 548.

690. Schoor, W. K. J. L'action de quelques substances sur la dextrine. (Recueil des travaux chimiques des Pays-Bas, Leide, 1884, tome 3, p. 18-19.) **PKA**

Results indicate that NaCl, NaHCO₃ and glycerol in alkaline solution convert dextrins to dextrose.

Abstract in *Jour. chem. soc.*, 1885, v. 48, p. 369; *Chem. Centr.*, 1884, p. 455.

691. Cazeneuve, P., and G. LINOSSIER. Sur une prétendue synthèse de la saccharose. (*Moniteur scientifique du docteur Quesneville*, Paris, 1885, série 3, tome 15, p. 783-785.)

Available in Library of Columbia University.

Have repeated experiments of certain inventors and find that sucrose is not formed by the action of an electric current on a mixture of starch hydrolytic products.

692. Ihl, Anton. Phenole als Reagentien für Kohlehydrate. (*Chemiker-Zeitung*, Cöthen, 1885, Jahrg. 9, p. 231.) **†† VOA**

Gives color reactions of starch and dextrin with α -naphtol, β -naphtol, resorcin, pyrogallol, phloroglucin and diphenylamine.

Abstract in *Jahresber. Chem.*, 1885, p. 1977.

693. Campari, G. Erhitzen von Stärke mit Salpetersäure. (Auszug.) (*Jahresbericht der Chemie*, Giessen, 1887, p. 2262.) **PKA**

Studies gaseous products obtained when starch is treated with HNO₃ of 1.33 specific gravity.

694. Horvat, V. Über die Produkte der trockenen Destillation von Stärkemehl mit Kalk. (Auszug.) (*Chemisches Central-Blatt*, Hamburg und Leipzig, 1887, p. 38-39.) **PKA**

Dry distillation of a mixture of 1 part starch with 4 parts chalk yielded a mixture of acetone and its condensation products.

Also abstracted in *Jahresber. Chem.*, 1887, p. 2262; *Jour. chem. soc.*, 1887, v. 52, p. 460.

695. Ihl, Anton. Neue Farbenreactionen der Stärke und der Gummiarten. (*Chemiker-Zeitung*, Cöthen, 1887, Jahrg. 11, p. 19.) **†† VOA**

Color reactions with hydroxy-aromatic compounds.

Abstract in *Jour. soc. chem. ind.*, 1887, v. 6, p. 306; *Chem. Centr.*, 1887, p. 154.

696. Rischbieth, P. Zur Darstellung der Lävulinsäure. (*Deutsche chemische Gesellschaft, Berichte*, Berlin, 1887, Jahrg. 20, p. 1773-1775.) **PKA**

The acid is prepared from starch.

Abstract in *Jahresber. Chem.*, 1887, p. 1745.

697. Guignet, C. E. Combinaisons de l'oxyde de cuivre avec les matières amy-lacées, les sucres et les mannites. Nouveaux réactifs pour l'analyse immédiate. (*Académie des sciences, Comptes rendus*, Paris, 1889, tome 109, p. 528-530.) ***EO**

Notes that starch absorbs cupric oxide from ammoniacal copper oxide solution, forming a blue compound which contains NH₃; the NH₃ is driven off by heating at 40°.

Abstract in *Jour. chem. soc.*, 1889, v. 56, p. 1133; *Chem. Centr.*, 1889, Bd. 2, p. 869; *Jahresber. Chem.*, 1889, p. 2459.

698. Ullik, F. Beiträge zur Kenntnis der Kohlehydrate. (*Zeitschrift für das gesammte Brauwesen*, München und Leipzig, 1892, Jahrg. 15, p. 15-17, 28-31, 39-41.)

Available in Library of Chemists' Club.

Amylums, soluble starches, dextrins and dextrin acids are among the carbohydrates discussed.

Abstract in *Jour. chem. soc.*, 1892, v. 62, p. 1066; *Chem. Centr.*, 1892, Bd. 1, p. 432-433.

699. Wilson, J. Arthur. Action of alkaline mercuric cyanide on maltose, dextrose, and dextrin. (*Chemical news*, London, 1892, v. 65, p. 169.) **VOA**

Treatment with alkaline mercuric cyanide markedly diminishes the optical activity of dextrin and maltose and completely destroys that of dextrose.

Abstract in *Jour. chem. soc.*, 1892, v. 62, p. 1032; *Chem. Centr.*, 1892, Bd. 1, p. 831.

700. Donath, E. Ueber invertirende Wirkungen des Glycerins. (*Journal für praktische Chemie*, Leipzig, 1894, N. F., Bd. 49, p. 546-548.) **PKA**

Notes that dextrin is not converted into maltose when heated with glycerol.

Abstract in *Jour. soc. chem. ind.*, 1894, v. 13, p. 823.

701. Starke, J. De la prétendue influence des substances albuminoïdes sur l'amidon et le glycogène. (*Archives de physiologie normale et pathologique*, Paris, 1895, année 27, p. 455-462.)

Available in Library of the New York Academy of Medicine.

Results indicate that sugar formation is due to the presence of bacteria.

Abstract in *Chem. Centr.*, 1895, Bd. 2, p. 1049.

702. Henderson, James. Action of sugars on ammoniacal silver nitrate. (*Chemical*

Starches and Dextrins, continued.

General Chemical Characteristics, continued.

Society of London, Journal, 1896, v. 69, p. 145-154.)

PKA

Notes that dilute solutions of starch and dextrin do not reduce ammoniacal silver nitrate.

703. Moissan, Henri. Recherches sur les différentes variétés de carbone. (Annales de chimie et de physique, Paris, 1896, série 7, tome 8, p. 289-347.)

PAA

On p. 297 notes that when starch is heated at 200° with fuming sulphuric acid a black material is obtained which is not pure carbon but contains an appreciable amount of combined hydrogen.

704. Musset, Franz. Einwirkung des Chloroforms auf Stärke. (Pharmaceutische Centralhalle, Dresden, 1896, Jahrg. 37, p. 587-588.)

Available in Library of Columbia College of Pharmacy.

Starch was dissolved in $ZnCl_2$ solution and $CHCl_3$ added. After standing for 3 months the starch was completely transformed into dextrins.

Abstract in *Jour. chem. soc.*, 1897, v. 72, part 1, p. 455; *Chem. Centr.*, 1896, Bd. 2, p. 703.

705. Stone, Winthrop E. The carbohydrates of wheat, maize, flour, and bread. (United States. — Office of Experiment Stations, Washington, 1896, Bulletin no. 34, p. 1-28.)

VPG

Notes that in making bread, the amount of starch changed does not average more than 10% of the total starch.

Abstract in *Jour. chem. soc.*, 1897, v. 72, part 2, p. 461; *Chem. Centr.*, 1897, Bd. 1, p. 853.

706. Young, Robert A. Precipitation of carbohydrates by neutral salts. (Journal of physiology, London, 1897-98, v. 22, p. 401-422.)

QCA

Starch hydrolytic products and their iodides are fractionally precipitated with finely powdered ammonium, magnesium and sodium sulphates. Three erythro-dextrins are obtained.

Abstract in *Jour. soc. chem. ind.*, 1898, v. 17, p. 590; *Jour. chem. soc.*, 1898, v. 74, p. 230; *Chem. Centr.*, 1898, Bd. 2, p. 887.

707. Fenton, Henry J. H., and MILDRED GOSTLING. Action of hydrogen bromide in presence of ether on carbohydrates and certain organic acids. (Chemical Society of London, Journal, 1898, v. 73, p. 554-559.)

PKA

Notes that starch gives a yellow color, whereas dextrin gives no color until after the mixture has stood for about 24 hours,

when a very faint trace of purple color becomes apparent.

Abstract in *Chem. Centr.*, 1898, Bd. 2, p. 181.

708. Brown, Horace T., and G. HARRIS MORRIS. The amylo-dextrin of W. Nageli, and its relation to soluble starch. (Chemical Society of London, Journal, 1889, v. 55, p. 449-461.)

PKA

Amylodextrin is differentiated from the two substances with which it has been confounded — soluble starch and the so-called starch cellulose — by its solubility, its iodine coloration, its crystalline structure, and its behavior with amylase and with acids.

Abstract in *Jour. soc. chem. ind.*, 1889, v. 8, p. 716; *Ber.*, 1889, Jahrg. 22, R. p. 740; *Bull. soc. chim. Paris*, 1890, série 3, tome 4, semestre 2, p. 682-683; *Wag. Jahr.*, 1889, Jahrg. 35, p. 870.

709. Rodewald, Hermann, and A. KATTEIN. Über die Herstellung von Stärkelösungen und Rückbildung von Stärkekörnern aus den Lösungen. (Königlich Preussische Akademie der Wissenschaften zu Berlin, Sitzungsberichte, 1899, p. 628-630.)

***EF**

Starch iodide is decomposed by boiling its solution and the iodine separated by steam; on cooling the solution a precipitate is formed, which consists of spherical starch granules, while some starch remains in solution.

Abstract in *Jour. soc. chem. ind.*, 1899, v. 18, p. 1062; *Jour. chem. soc.*, 1900, v. 78, part 2, p. 79; *Chem. Centr.*, 1899, Bd. 2, p. 419.

710. Sestini, Fausto. Formation of furfuraldehyde from starch and its derivatives. (Abstract.) (Chemical Society of London, Journal, 1899, v. 76, part 1, p. 103.)

PKA

Dry starch was found to yield furfural when heated to 180° and, when moistened with H_2SO_4 , to yield furfural at 100°.

Also abstracted in *Jour. soc. chem. ind.*, 1898, v. 17, p. 861.

711. Windisch, W. Ueber Furfurolbildung, mit besonderer Berücksichtigung der Bedingungen beim Maisch- und Würzekochprozess. (Wochenschrift für Brauerei, Berlin, 1899, Jahrg. 16, p. 653-654.)

Available in Library of the Brewers' Academy.

Mentions the formation of furfural by the action of boiling acids on starch.

712. Hofmann, K. A. Über das Mercabid $C_2Hg_2O_4H_2$. (Deutsche chemische Gesellschaft, Berichte, Berlin, 1900, Jahrg. 33, p. 1328-1339.)

PKA

Notes that the mercabide may be prepared by treating starch with yellow mercuric oxide and aqueous alkali. If the product of this action is extracted with nitric acid, the nitrate of the mercabide is ob-

*Starches and Dextrins, continued.**General Chemical Characteristics, continued.*

tained, accompanied by another nitrate of the composition $C_6H_6O_2Hg_2NO_3$.

Abstract in *Jour. chem. soc.*, 1900, v. 78, part 1, p. 383; *Bull. soc. chim. Paris*, 1901, série 3, tome 26, p. 122.

713. Ostwald, Wilhelm. Periodische Erscheinungen bei der Auflösung des Chroms in Säuren. (*Zeitschrift für physikalische Chemie*, Leipzig, 1900, Bd. 35, p. 204-256.)

PKA

Dextrin has a very marked effect in bringing about this regular periodicity. The action of dextrin is studied in detail.

Abstract in *Jour. chem. soc.*, 1901, v. 80, part 2, p. 24; *Bull. soc. chim. Paris*, 1901, série 3, tome 26, p. 876-877.

714. Rodewald, Hermann, and A. KATTEIN. Über natürliche und künstliche Stärkekörner. (*Zeitschrift für physikalische Chemie*, Leipzig, 1900, Jahrg. 33, p. 579-592.)

PKA

Wheat starch is brought into solution by heating with iodine at 130° , the iodine removed and the starch precipitated; the starch so obtained resembles pure starch grains.

For a number of starches and for a soluble amylose determine heat produced by soaking in water. The molecular weight of starch is 36,700 to 39,700 as determined by the osmotic pressure of starch iodide.

Abstract in *Jour. chem. soc.*, 1900, v. 78, part 1, p. 477; *Chem. Centr.*, 1900, Bd. 2, p. 180; *Jahresber. Chem.*, 1900, p. 829.

715. Schneider, and BECKER. Über Zinkoxyd-, Stärke-, Resorcin-Paste. (*Pharmaceutische Centralhalle, Dresden*, 1900, Jahrg. 41, p. 17-18.)

Available in Library of the New York Academy of Medicine.

Note that the mixture is colored blue by traces of ammonia in the air.

Abstract in *Chem. Centr.*, 1900, Bd. 1, p. 356.

716. Tsvett. Sur la liquéfaction réversible. Nouvelle propriété physico-chimique de substances albuminoïdes. (*Société chimique de Paris, Bulletin*, 1900, série 3, tome 23, p. 309-319.)

PKA

On p. 316 notes that starch, when treated with resorcinol or chloral hydrate, undergoes an enormous swelling process but does not liquefy.

717. Beckmann, Ernst. Zur Kenntniss des sogenannten Honigdextrins. (*Zeitschrift für Untersuchung der Nahrungs- und Genussmittel*, Berlin, 1901, Bd. 4, p. 1065-1069.)

Available in Library of the Chemists' Club.

Investigates the amount of dextrin pre-

cipitated from honey by lead acetate, baryta and methyl alcohol. Confirms the chemical individuality of achroodextrin 3 or malto-dextrin β .

Abstract in *Jour. soc. chem. ind.*, 1902, v. 21, p. 180.

718. Lindet, Léon. Sur les états que présente l'amidon dans le pain tendre et dans le pain rassis. (*Société chimique de Paris, Bulletin*, 1902, série 3, tome 27, p. 634-639.)

PKA

Abstract in *Chem. Centr.*, 1902, Bd. 2, p. 394.

719. Maquenne, Léon. Recherches sur l'amidon. (*Annales de chimie et de physique*, Paris, 1904, série 8, tome 2, p. 109-134.)

PAA

Chiefly a review of recent articles.

720. Suida, W. Über das Verhalten von Teerfarbstoffen gegenüber Stärke, Kieselsäure und Silikaten. (*Monatshefte für Chemie*, Wien, 1904, Bd. 25, p. 1107-1143.)

Available in Library of Columbia University.

Finely ground potato starch was shaken with an aqueous solution of various basic dyes, the solution decanted and the starch thoroughly washed with fresh water. The starch remains colored by the most strongly basic dyes, the color intensity decreasing with the basicity. Believes a chemical reaction is involved in the dyeing of starch.

Abstract in *Jour. chem. soc.*, 1905, v. 83, part 1, p. 75; *Chem. Centr.*, 1905, Bd. 1, p. 128-130; *Bull. soc. chim. Paris*, 1905, série 3, tome 34, p. 437.

721. Tondera, F. Beitrag zur Kenntnis des funktionellen Wertes der Stärkescheide. (*Académie des sciences de Cracovie, Bulletin, Classe des sciences mathématiques et naturelles*, 1904, p. 512-516.)

*QPA

Abstract in *Chem. Centr.*, 1903, Bd. 2, p. 1449.

722. Boidin, A. Contribution à l'étude de la cuisson des grains. (*Association des chimistes, Bulletin*, Paris, 1905-06, tome 23, p. 133-135.)

VOA

Investigates effect of phosphates when starch pastes are heated under pressure.

Abstract in *Chem. Centr.*, 1905, Bd. 2, p. 1201.

723. Dauwe, Ferdinand. Über die Absorption der Fermente durch Kolloide. (*Beiträge zur chemischen Physiologie und Pathologie*, Braunschweig, 1905, Bd. 6, p. 426-453.)

Available in Library of Columbia University.

Notes that the absorption of pepsin by rice starch is much less than by albumin or certain other substances.

Abstract in *Bull. soc. chim. Paris*, 1906, série 3, tome 36, p. 135.

Starches and Dextrins, continued.

General Chemical Characteristics, continued.

724. Fernbach, Auguste, and JULES WOLFF. De quelques circonstances qui influent sur l'état physique de l'amidon. (Académie des sciences, Comptes rendus, Paris, 1905, tome 140, p. 1403-1406.) *EO

A study of the acidity of various starches.

725. Boidin, A. Sur la liquéfaction des empois de fécule et de grains. (Académie des sciences, Comptes rendus, Paris, 1906, tome 143, p. 511-512.) *EO

A further study of the effect of alkali phosphates on the liquefaction of starch.

Condensed in *Bull. assoc. chimistes*, 1906-07, tome 24, p. 720.

Abstract in *Chem. abst.*, 1907, v. 1, p. 247; *Jour. chem. soc.*, 1906, v. 90, part 1, p. 933; *Chem. Centr.*, 1906, Bd. 2, p. 1563; *Bull. soc. chim. Paris*, 1907, série 4, tome 1, p. 96.

726. Fernbach, Auguste, and JULES WOLFF. Sur le mécanisme de l'influence des acides, des bases et des sels dans la liquéfaction des empois de fécule. (Académie des sciences, Comptes rendus, Paris, 1906, tome 143, p. 380-383.) *EO

The liquefaction of neutralized starch paste is unaffected by neutral salts, is retarded by alkaline salts and prevented altogether by free alkali (methyl orange being the standard of neutrality).

Reprinted in *Bull. assoc. chimistes*, 1906-07, tome 24, p. 572-575.

Abstract in *Jour. chem. soc.*, 1906, v. 90, part 1, p. 804; *Jour. soc. chem. ind.*, 1906, v. 25, p. 898; *Chem. Centr.*, 1906, Bd. 2, p. 1046; *Jahresber. Chem.*, 1905-08, Teil 2, p. 4786.

727. Neilson, C. Hugh. Inversion of starch by platinum black. (American journal of physiology, Boston, 1906, v. 15, p. 412-415.) QCA

Abstract in *Jour. chem. soc.*, 1906, v. 90, part 1, p. 235; *Chem. Centr.*, 1906, Bd. 1, p. 1152; *Jahresber. Chem.*, 1905-08, Teil 2, p. 943.

728. Fischer, Hugo. Zur Färbungstheorie. (Zeitschrift für physikalische Chemie, Leipzig, 1908, Bd. 63, p. 480-486.) PKA

Discusses structure of starch grains. Describes several experiments on the absorption of dyes, acetic acid, etc., by starch grains.

Abstract in *Chem. abst.*, 1908, v. 2, p. 3016; *Chem. Zentr.*, 1908, Bd. 2, p. 1704.

729. Rosenthal, J. Zerlegung hochkomplizierter chemischer Verbindungen im schwankenden magnetischen Kraftfeld. (Akademie der Wissenschaften zu Berlin, Sitzungsberichte, 1908, p. 20-26.) *EE

The decomposition of starch takes place in stages, the succession of products being the same as those found during enzymic hydrolysis. Discusses analogy between the

action of electro-magnetic forces and that of enzymes.

Abstract in *Jour. chem. soc.*, 1908, part 2, p. 152; *Chem. Centr.*, 1908, Bd. 1, p. 593.

730. Binder, O. Zur Verkokungsprobe. (Zeitschrift für analytische Chemie, Wiesbaden, 1909, Jahrg. 48, p. 372-375.) PKA

Studies amount and nature of coke obtained from starches, dextrins and other substances.

Abstract in *Chem. abst.*, 1909, v. 3, p. 1970.

731. Bottazi, F. Sul trasporto elettrico del glicogeno (e dell'amido). (Reale accademia dei Lincei, Atti, Roma, 1909, serie 5, v. 18, semestre 2, p. 87-90.) *ER

Notes that in acid solution starch migrates towards the cathode and in alkaline solution towards the anode, while in the presence of neutral salts no migration is observed.

Abstract in *Chem. abst.*, 1910, v. 4, p. 342; *Jour. chem. soc.*, 1909, v. 96, part 1, p. 700; *Chem. Zentr.*, 1909, Bd. 2, p. 1423; *Jahresber. Chem.*, 1909, Jahrg. 63, Bd. 2, p. 379; *Bull. assoc. chimistes*, 1910-11, tome 28, p. 289; *Bull. soc. chim. Paris*, 1910, série 4, tome 8, p. 1020.

732. Brunacci, Bruno. L'azione degli elettroliti sul substrato della fermentazione. (Bullettino delle scienze mediche, Bologna, 1909, anno 80, p. 245.)

Available in Library of New York Academy of Medicine.

733. Kopper, A. Zum Hefemischverbot. (Chemiker-Zeitung, Cöthen, 1909, Jahrg. 33, p. 110.) ††VOA

Finds that addition of starch to pressed yeast causes a marked decrease in fermentative power.

734. Neuberg, Carl. Chemische Umwandlungen durch Strahlenarten. 2. Wirkungen des elektrischen Gleichstromes. (Biochemische Zeitschrift, Berlin, 1909, Bd. 17, p. 270-292.) PPB

Solutions of various substances were submitted to the action of a 220-volt direct current. Starch was acted on very slowly; only after 4 or 5 days was the presence of reducing sugar detected.

735. Vignon, Leo. Influence de l'état colloïdal sur la teinture. (Société chimique de Paris, Bulletin, 1909, série 4, tome 5, p. 678-681.) PKA

The affinity of various acid and basic dyes for gelatin and starch has been examined by observing the extent to which the coloring matter diffuses from the dyed jellies when these are immersed in water.

Abstract in *Chem. abst.*, 1910, v. 4, p. 516.

736. Whympster, R. Microscopical study of changes occurring in starch granules during

*Starches and Dextrins, continued.**General Chemical Characteristics, continued.*

germination of wheat. (International Congress of Applied Chemistry, 7th, London, 1909, section 6a, p. 7-13.) **PKR**

The effect of mineral acids, enzymes, and heat on granules of various starches.

Duplicate abstracts in *Jour. soc. chem. ind.*, 1909, v. 28, p. 806; *Chem. abst.*, 1910, v. 4, p. 1821; *Zeit. ang. Chem.*, 1909, Jahrg. 22, p. 1248.

737. Coninck, W. Oechsner de. Action de quelques réactifs hydratants sur l'amidon. (Académie royale de Belgique, Bulletin, Classe des sciences, Bruxelles, 1910, p. 586-587.) ***EM**

Finds that a large number of organic and inorganic substances, when boiled with starch, effect partial conversion into sugar.

Abstract in *Chem. abst.*, 1911, v. 5, p. 1585; *Chem. Zentr.*, 1910, Bd. 2, p. 1459.

738. Robinson, F. Adsorption of acids by carbohydrates. (Cambridge Philosophical Society, Proceedings, Cambridge, 1910, v. 15, p. 548-558.) ***EC**

Includes study of adsorption of HCl and HBr with starch.

Abstract in *Chem. abst.*, 1911, v. 5, p. 476.

739. Colwell, H. A., and S. Russ. The conversion of starch into dextrin by X-rays. (Physical Society of London, Proceedings, 1911-12, v. 24, p. 217-221.) **PAA**

Find that erythrodextrin is formed; dextrin solutions are apparently unaffected.

Abstract in *Chem. abst.*, 1912, v. 6, p. 2863; *Chemical world*, 1912, v. 1, p. 250; *Chem. Zentr.*, 1912, Bd. 2, p. 705.

740. Galeotti, G. Dilatometrische Untersuchungen bei den hydrolytischen Spaltungen. (*Zeitschrift für physikalische Chemie*, Leipzig, 1911, Bd. 76, p. 105-126.) **PKA**

Notes that the hydrolysis of starch paste, whether effected by acids or enzymes, is accompanied by a decrease in volume.

Abstract in *Chem. abst.*, 1911, v. 5, p. 1701; *Chem. Zentr.*, 1911, Bd. 1, p. 1197.

741. Lloyd, Hoyes. The adsorption of some substances by starches. (American Chemical Society, Journal, Easton, 1911, v. 33, p. 1213-1226.) **PKA**

As a result of experiments on adsorption of HCl, NaOH and NaCl by cassava, arrowroot, potato, rice and maize starch granules, a variation was noted with the different starches. The adsorption was not a function of the granule surface per unit weight. NaOH was adsorbed in greater amounts than either HCl or NaCl. With HCl the ordinary adsorption rule is followed

for solutions up to 0.4N, except in case of maize starch. — *Chem. abst.*

Abstract in *Chem. Zentr.*, 1911, Bd. 2, p. 1126; *Bull. soc. chim. Paris*, 1912, série 4, tome 12, p. 258.

742. Massol, L. Action des radiations ultraviolettes sur l'amidon. (Académie des sciences, Comptes rendus, Paris, 1911, tome 152, p. 902-904.) ***EO**

Soluble starch goes through a process of saccharification, when acted upon by ultraviolet light in a slightly acid medium.

Abstract in *Jour. chem. soc.*, 1911, v. 100, part 1, p. 356; *Jour. soc. chem. ind.*, 1911, v. 30, p. 503; *Chem. Zentr.*, 1911, Jahrg. 82, Bd. 1, p. 1686.

743. Rakovski, Adam V. Adsorption. 1. Chemical hysteresis. [Title translated.] (Russian Physical Chemistry Society, Journal, St. Petersburg, 1911, tome 43, p. 170-186.)

Available in Library of the Chemists' Club.

The first of a series of 12 articles, all appearing in this journal, in which the action of starch as a typical colloid, is investigated. Vapor pressure of colloids in gel condition is plotted against per cent water present; the curve shown when the gel is taking up water does not coincide with that when it is losing water; the phenomena is termed chemical hysteresis. Experiments with 3 starches show that the magnitude of hysteresis does not amount to more than 2 to 3, the curves varying somewhat according to the origin of the starch.

Reprinted in *Zeitschrift für Chemie und Industrie der Kolloide*, 1911, Bd. 9, p. 225-230(1).

Abstract in *Chem. Zentr.*, 1911, Bd. 1, p. 1478; *Jour. chem. soc.*, 1911, v. 100, part 2, p. 470; *Chem. abst.*, 1912, v. 6, p. 19; *Bull. soc. chim. Paris*, 1911, série 4, tome 10, p. 1574.

744. — Adsorption. 2. Chemical hysteresis. [Title translated.] (Russian Physical Chemistry Society, Journal, St. Petersburg, 1911, tome 43, p. 186-201.)

Available in Library of the Chemists' Club.

Gives equation for the above hydration-dehydration curves of gelatinized starches.

Reprint in *Zeitschrift für Chemie und Industrie der Kolloide*, 1912, Bd. 10, p. 22-31(2).

Abstract in *Chem. Zentr.*, 1911, Bd. 1, p. 1479; *Jour. chem. soc.*, 1911, v. 100, part 2, p. 470; *Chem. abst.*, 1912, v. 6, p. 19; *Bull. soc. chim. Paris*, 1911, série 4, tome 10, p. 1574.

745. — Adsorption. 3. Analogy between gels and ordinary solutions. [Title translated.] (Russian Physical Chemistry Society, Journal, St. Petersburg, 1911, tome 43, p. 362-374.)

Available in Library of the Chemists' Club.

"Shows that the above expression, formu-

Starches and Dextrins, continued.

General Chemical Characteristics, continued.

lated for starches, is analogous to that for inorganic aqueous solutions."

Abstract in *Chem. Zentr.*, 1911, Bd. 2, p. 178; *Jour. chem. soc.*, 1911, v. 100, part 2, p. 471; *Chem. abst.*, 1912, v. 6, p. 19.

746. — Adsorption. 4. Thermodynamics of irreversible processes and chemical hysteresis. [Title translated.] (Russian Physical Chemistry Society, Journal, St. Petersburg, 1911, tome 43, p. 1762-1784.) **PKA**

A mathematical discussion of Duhem's theories, using experimental data based on observations of potato starch during dehydration.

Abstract in *Chem. Zentr.*, 1912, Bd. 1, p. 970; *Chem. abst.*, 1912, v. 6, p. 1246; *Jour. chem. soc.*, 1912, v. 102, part 2, p. 237.

747. Samec, Max. Studien über Pflanzenkolloide. 1. Die Lösungsquellung der Stärke bei Gegenwart von Kristalloiden. (Kolloidchemische Beihefte, Dresden and Leipzig, 1911-12, Bd. 3, p. 123-160.) **PKA**

The temperature at which starch swelling occurs is determined by observing change in transparency and refractive index. Using the same starch, determines effect on temperature produced by acids, alkalis and non-electrolytes, all at varying concentrations. The temperature decrease effected by chloral hydrate was most noticeable.

Abstract in *Chem. Zentr.*, 1912, Bd. 1, p. 1384-1386; *Jour. chem. soc.*, 1912, v. 102, part 2, p. 144; *Chem. abst.*, 1912, v. 6, p. 1913.

748. Verzár, Fritz. Aufsaugung und Ausscheidung von Stärkekörnern. (Biochemische Zeitschrift, Berlin, 1911, Bd. 34, p. 86-93.) **PPB**

749. Bielecki, Jean, and RENÉ WURMSER. Action des rayons ultraviolets sur l'amidon. (Académie des sciences, Comptes rendus, Paris, 1912, tome 154, p. 1429-1432.) ***EO**

Demineralized potato starch was exposed to the rays from a mercury lamp for 1 to 225 hours. The conductivity and pH increase with time. Formaldehyde, dextrins, reducing sugars and pentoses are formed.

A more detailed account in *Biochemische Zeitschrift*, Berlin, 1912, Bd. 43, p. 154-164.

Abstract in *Chem. abst.*, 1912, v. 6, p. 2082; *Bull. assoc. chimistes*, 1912-13, tome 30, p. 56.

750. Curtman, L. J., and H. DUBIN. The influence of non-volatile organic matter and certain acids on the precipitation of the ammonium sulfide group of metals. (American Chemical Society, Journal, Easton, 1912, v. 34, p. 1485-1493.) **PKA**

On p. 1489 notes that dextrin inhibits the precipitation of Fe, Cr, and Al when solutions of their salts are made alkaline with NaOH.

751. Loeb, Walther. Über das Verhalten der Stärke unter dem Einfluss der stillen Entladung. (Biochemische Zeitschrift, Berlin, 1912, Bd. 46, p. 121-124.) **PPB**

The discharge from an induction coil rapidly decomposes starch with formation of reducing substances.

Abstract in *Chem. abst.*, 1913, v. 7, p. 476; *Jour. chem. soc.*, 1912, v. 102, part 1, p. 947; *Bull. soc. chim. France*, 1913, série 4, tome 14, p. 1076; *Chem. Zentr.*, 1912, Bd. 2, p. 2063.

752. Malfitano, G., and A. MOSCHKOFF. Sur la dextrinisation de l'amidon par dessiccation. (Académie des sciences, Comptes rendus, Paris, 1912, tome 154, p. 443-446.) ***EO**

Starch was dehydrated over phosphoric anhydride at the ordinary temperature and at higher temperatures up to 150°, the loss of water, percentage of carbon and hydrogen, and amount of soluble matter formed being determined from time to time.

Abstract in *Jour. chem. soc.*, 1912, v. 102, part 1, p. 240; *Chem. abst.*, 1912, v. 6, p. 1552; *Jour. soc. chem. ind.*, 1912, v. 31, p. 245; *Chem. Zentr.*, 1912, Bd. 1, p. 1103.

753. — Sur la défloculation de l'amidon. (Société chimique de France, Bulletin, Paris, 1912, série 4, tome 11, p. 606-612.) **PKA**

Consider that the system water-starch is never a true solution but always a hydrogel or hydrosol.

Abstract in *Chem. abst.*, 1912, v. 6, p. 2875; *Chem. Zentr.*, 1912, Bd. 2, p. 424.

754. Massol, L. Action des rayons ultraviolets sur l'amidon. (Académie des sciences, Comptes rendus, Paris, 1912, tome 154, p. 1645-1646.) ***EO**

Referring to recent work of Bielecki and Wurmser (*entry 749*) calls attention to his own work (*entry 742*).

Abstract in *Jour. chem. soc.*, 1912, v. 102, part 1, p. 538; *Chem. abst.*, 1912, v. 6, p. 2421; 1913, v. 7, p. 430.

755. Mattill, Helen I., and H. A. MATTILL. The influence of electrolytes on the precipitation of soluble starch. (Abstract.) (Biochemical bulletin, New York, 1912-13, v. 2, p. 553-554.) **PPB**

Starch solutions, when dialyzed free from electrolytes, are not precipitated by alcohol. Addition of a drop of salt solution, however, permits precipitation. The lower limits of precipitation for a number of electrolytes are determined.

756. Rakovski, Adam V. Adsorption. 6. Kinetics of hydration and dehydration. [Title translated.] (Russian Physical Chemistry Society, Journal, St. Petersburg, 1912, tome 44, p. 836-849.) **PKA**

Two-thirds of the total amount of water, which starch is capable of adsorbing, is

*Starches and Dextrins, continued.**General Chemical Characteristics, continued.*

taken up within the first 24 hours, while the remaining one-third requires two months. Starch in the form of grains, after adsorbing the maximum of water in a damp atmosphere, is incapable of taking up more water when immersed in the latter.

Reprint in *Zeitschrift für Chemie und Industrie der Kolloide*, 1912, Bd. 11, p. 19-25 (3), PKA.

Abstract in *Chem. abst.*, 1912, v. 6, p. 2876; *Chem. Zentr.*, 1912, Bd. 2, p. 668; *Jour. chem. soc.*, 1912, Abstract in *Chem. abst.*, 1911, v. 5, p. 1585; *Chem. série 4*, tome 12, p. 1540.

757. Heimrod, Geo. W. Zerlegung hochkomplizierter chemischer Verbindungen im schwankenden magnetischen Kraftfeld. (*Zeitschrift für Elektrochemie*, Halle, 1913, Jahrg. 19, p. 812-816.) PKA

Results directly contradict those of Rosenthal (*entry 729*). Finds the hydrolysis of starch by acids or enzymes is not affected by the electromagnetic field.

Abstract in *Chem. abst.*, 1914, v. 8, p. 863; *Chem. Zentr.*, 1913, Bd. 2, p. 2082.

758. Malfitano, G., and A. Moschkoff. Pseudo cristaux d'amidon et cristaux de glucose. (*Académie des sciences, Comptes rendus*, Paris, 1913, tome 156, p. 1412-1415.) *EO

Have examined the solid and transparent particles found in congealed starch paste. Some of these particles resembled crystals of glucose, but have no distinct polyhedral forms and do not exhibit the phenomenon of birefringence.

Abstract in *Chem. Zentr.*, 1913, Bd. 2, p. 492; *Bull. assoc. chimistes*, 1912-13, tome 30, p. 896.

759. — Défloculation de l'amidon et dissolution du glucose. (*Académie des sciences, Comptes rendus*, Paris, 1913, tome 156, p. 1681-1683.) *EO

The dissolving or deflocculation of starch is observed under the ultramicroscope.

Abstract in *Chem. abst.*, 1913, v. 7, p. 3058; *Chem. Zentr.*, 1913, Bd. 2, p. 493.

760. Mecklenburg. Über affine Adsorptionskurven. 1. (*Zeitschrift für physikalische Chemie*, Leipzig, 1913, Bd. 83, p. 609-624.) PKA

Includes a study of adsorption of BaSO₄ by two starches.

Abstract in *Chem. abst.*, 1913, v. 7, p. 2879; *Chem. Zentr.*, 1913, Bd. 2, p. 1014.

761. Marc, Robert. Über Adsorption und gesättigte Oberflächen. (*Zeitschrift für physikalische Chemie*, Leipzig, 1913, Bd. 81, p. 641-694.) PKA

Includes study of adsorption of BaSO₄, BaCO₃, CaCO₃, SrCO₃, and PbCO₃ by starch and dextrin.

762. Rakovski, Adam V. Adsorption. 7. Chemical hysteresis of starches. [Title translated.] (*Russian Physical Chemistry Society, Journal*, St. Petersburg, 1913, tome 44, p. 1722-1728.) PKA

Gives curves and data for Bermuda arrowroot and rice starch. The curves that are intermediate between the hydration-dehydration curves seem to be reversible in certain parts only. Addition of 1% mercuric chloride to prevent mold exerts no appreciable influence on the course of either hydration or dehydration.

Reprint in *Zeitschrift für Chemie und Industrie der Kolloide*, 1912, Bd. 11, p. 269-272, (5), PKA.

Abstract in *Chem. abst.*, 1913, v. 7, p. 1121; *Jour. chem. soc.*, 1913, v. 104, part 2, p. 114; *Chem. Zentr.*, 1913, Bd. 1, p. 586.

763. Bantlin, Gerhard. Pyrogene Zersetzung von Cellulose, Stärke, Zucker und Sulfitecelluloseablauge. (*Journal für Gasbeleuchtung und verwandte Beleuchtungsarten sowie für Wasserversorgung*, München und Berlin, 1914, Jahrg. 57, p. 32-41, 55-61.) †3-VOA

Distillation was carried out in an iron retort up to 500°; determined amounts of coke, acetic acid, aldehydes, ketones, tar and composition of the gases.

Abstract in *Chem. abst.*, 1914, v. 8, p. 1344; *Jour. soc. chem. ind.*, 1914, v. 33, p. 129; *Chem. Zentr.*, 1914, Jahrg. 85, Bd. 1, p. 922-924.

764. Katz, J. R. De snelheid van het oudbakken worden van brood. (*Akademie van Wetenschappen te Amsterdam, Verslag*, 1914, deel 23, p. 652-655.) *EL

Finds the change in the power of starch for holding water does not run quite parallel with the staling of bread.

Abstract in *Chem. abst.*, 1915, v. 9, p. 1808.

765. — Het oudbakken worden is een verandering die niet enkel bij tarwe- en roggezetmeel voorkomt doch bij alle zetmeelsoorten, maar die toevallig alleen bij tarwe en rogge tot practisch belangrijke resultaten voert. (*Akademie van Wetenschappen te Amsterdam, Verslag*, 1914, deel 23, p. 655-658.) *EL

An account of experiments on the imbibing power and solubility of "bread" made of flour or meal from 8 different kinds of grain. — *Chem. abst.*

766. Rakovski, Adam V. Adsorption. 10. Adsorption of starch in aqueous-ammoniacal solutions of cupric hydroxide. [Title translated.] (*Russian Physical Chemistry Society, Journal*, St. Petersburg, 1914, tome 46, p. 246-258.) PKA

Determination of the relative amounts of Cu and NH₃ adsorbed by starch from a solution of the copper-ammonium complex,

Starches and Dextrins, continued.

General Chemical Characteristics, continued.

shows the composition of the latter to be $\text{Cu}(\text{NH}_3)_2(\text{OH})_2$. Other results are shown by curves and numerous tables.

Abstract in *Chem. Zentr.*, 1914, Bd. 1, p. 2146; *Chem. abst.*, 1914, v. 8, p. 2512; *Jour. chem. soc.*, 1914, v. 106, part 2, p. 434; *Bull. soc. chim. France*, 1914, série 4, tome 16, p. 868.

767. Samec, Max. Die kolloiden Zustandsänderungen der Stärke. (Internationale Zeitschrift für physikalisch-chemische Biologie, Leipzig und Berlin, 1914, Bd. 1, p. 173-188.)

Available in Library of the Surgeon General's Office.

Author summarizes his previous work.

Abstract in *Chem. Zentr.*, 1914, Bd. 2, p. 1145.

768. Warth, F. J., and D. B. DARABSETT. The fractional liquefaction of rice starch. (India. — Department of Agriculture, Memoirs, Chemical series, Calcutta, 1914, v. 3, p. 135-147.) **VPH**

Finely divided starch is suspended in water at the desired temperature (50-80°) for 1 hour, treated with malt extract at 30° (the unaltered granules are not affected at this temperature), a portion of the filtered solution hydrolyzed with HCl and the dextrose determined by Fehling's solution. Characteristic curves are obtained for various rice starches by plotting percentage liquefaction against temperature.

Abstract in *Jour. soc. chem. ind.*, 1914, v. 33, p. 433; *Chem. abst.*, 1914, v. 8, p. 2080.

769. Arendt, Oskar. Zum zeitlichen Verlauf der Adsorption. (Kolloidchemische Beihefte, Dresden und Leipzig, 1915, Bd. 7, p. 212-250.) **PKA**

Finds the rate of adsorption of starch by SrCO_3 is proportional to the rate of stirring. The temperature coefficient was very small. Solutions were analyzed by means of the Lowe-Zeiss interferometer. Further experiments were carried out using powdered charcoal as adsorbent.

Abstract in *Chem. abst.*, 1916, v. 10, p. 408; *Chem. Zentr.*, 1915, Bd. 2, p. 868.

770. Atkins, W. R. G., and E. G. WILSON. The preparation of anhydrous solids. (Chemical Society of London, Journal, 1915, v. 107, part 2, p. 916-918.) **PKA**

Kahlbaum's fat free starch was rendered anhydrous by distilling with benzene and absolute alcohol.

771. Katz, J. R. Is de verstijfseling een evenwichtsproces, dat door de massawerkingswet beheerscht wordt? (Akademie van Wetenschappen te Amsterdam, Verslag, 1915, deel 23, p. 1150-1159.) ***EL**

Further experiments were carried out on the properties of wheat starch with respect

to water. The results obtained lead to the conclusion that the swelling and stiffening of starch in water is an equilibrium process, the limiting condition thus depending on the temperature and on the relative amount of water present. — *Chem. abst.*

772. — Das Altbackenwerden der Brotkrume vom physiologisch-chemischen Standpunkte betrachtet. (Zeitschrift für physiologische Chemie, Strassburg, 1915, Bd. 95, p. 104-129, 136-146, 147-151.) **PKA**

The staling of bread is shown to be due to a decrease in capacity of the starch granules for absorbing water, to a decrease in amount of water soluble polysaccharides and to a transfer of moisture from the hardening starch granules to the surrounding gluten. Staling is very nearly the reverse process of baking. These transformations are not peculiar to wheat starch but are characteristic of all common starches.

Abstract in *Jour. chem. soc.*, 1916, v. 110, part 1, p. 465-466; *Jour. soc. chem. ind.*, 1916, v. 35, p. 901-902; *Chem. Zentr.*, 1916, Bd. 1, p. 262-264.

773. Rakovski, Adam V. Adsorption. 12. Principle of the mobility of water in adsorption compounds. [Title translated.] (Russian Physical Chemistry Society, Journal, Petrograd, 1915, tome 47, p. 1326-1329.) **PKA**

The mobility of water in gels and in aqueous solutions is contrasted by following the change in water content of moist potato starch and a solution of sulphuric acid placed in desiccators of differing aqueous vapor pressures.

Duplicate abstracts in *Jour. chem. soc.*, 1916, v. 110, part 2, p. 17, and *Chem. abst.*, 1916, v. 10, p. 2828.

774. Trousoff, A. Formation of humus by means of vegetable compounds. (Abstract.) (Chemical abstracts, Easton, 1915, v. 9, p. 3112.) **PKA**

Studies action of acids, alkalies and salts on starch and dextrins at various temperatures. Notes the formation of humus.

775. Verschaffelt, E., and E. VAN TEUTEM. Die Änderung der mikroskopischen Struktur des Brotes beim Altbackenwerden. (Zeitschrift für physiologische Chemie, Hoppe-Seyler's, Strassburg, 1915, Bd. 95, p. 130-135.) **PKA**

The "crumbly" condition of stale bread is connected with the appearance of air spaces between the edges of the starch grains and the surrounding gluten. Safranine, which stains gluten a deep red but does not affect starch, is used in the microscopic examination.

Abstract in *Jour. soc. chem. ind.*, 1916, v. 35, p. 902; *Chem. Zentr.*, 1916, Bd. 1, p. 262.

776-777. Datta, Rasik L., and N. R. CHATTERJEE. Halogenation. 12. The formation of

Starches and Dextrins, continued.

General Chemical Characteristics, continued.

chloropicrin and tetrachloroquinone by the action of aqua regia on organic substances. (American Chemical Society, Journal, Easton, 1916, v. 38, p. 1813-1821.) **PKA**

Note that only a slight smell of chloropicrin is evident when starch is warmed on the sand bath with aqua regia for 3 hours.

778. Harrison, William. Some properties of starch considered from a colloid-chemical standpoint. (Society of Dyers and Colourists, Journal, Bradford, 1916, v. 32, p. 40-44.) **† VLG**

Evidence that the characteristic cross shown by starch under polarized light is due to pressure within the granules, that there is no truly soluble starch, that the properties of the outer and inner portions of the granule are mutually transferable, that it is the presence of inorganic salts which causes precipitation of starch solutions by alcohol and that the composition of the $\text{Ba}(\text{OH})_2$ precipitate varies in accordance with the adsorption formula. Six photomicrographs are given.

Abstract in *Chem. abst.*, 1916, v. 10, p. 2535; *Jour. chem. soc.*, 1916, v. 110, part 1, p. 251; *Jour. soc. chem. ind.*, 1916, v. 35, p. 321.

779. Rakuzin, M. A. Comparative adsorption of sucrose, inulin, and dextrin. [Title translated.] (Russian Physical Chemistry Society, Journal, Petrograd, 1916, tome 48, p. 1319-1324.) **PKA**

Notes that animal charcoal adsorbs 8% of β achroodextrin and aluminium hydroxide 16% of products intermediate to β and γ achroodextrins. Commercial dextrinum purissimum is a mixture of maltodextrin, β achroodextrin and β and γ dextrins.

Abstract in *Chem. abst.*, 1917, v. 11, p. 1434; *Jour. chem. soc.*, 1917, v. 112, part 2, p. 294; *Chem. Zentr.*, 1923, Bd. 3, p. 1070; *Bull. soc. chim. France*, 1923, série 4, tome 34, p. 1657.

780. Berczeller, L., and E. SZEGÖ. Die Autooxydation der Zuckerarten. (Biochemische Zeitschrift, Berlin, 1917, Bd. 84, p. 1-36.) **PPB**

Note that starch inhibits the autooxydation of sugars.

781. Schulte, Wilh. Ein Fällungsmittel für Zucker-, Stärkearten, Gummi, Eiweissstoffe und organische Säuren. (Chemiker-Zeitung, Cöthen, 1917, Jahrg. 41, p. 822.) **†† VOA**

Ammoniacal lead acetate solution is used.

Abstract in *Chem. abst.*, 1918, v. 12, p. 1534; *Chem. Zentr.*, 1918, Bd. 1, p. 141.

782. Stocks, H. B. Colloid chemistry of starch, gums, hemicelluloses, albumin, casein, gluten and gelatin. (British Association

for the Advancement of Science, Report, London, 1917, p. 65-97.) *** EC**
Review.

783. Berczeller, L. Über negative Adsorption. (Biochemische Zeitschrift, Berlin, 1918, Bd. 90, p. 290-293.) **PPB**

Negative adsorption was observed with starch and serum albumin towards sugar solutions. — *Chem. abst.*

784. Birchard, F. T. The determination of moisture in wheat. (Society of Chemical Industry, Journal, London, 1918, v. 37, p. 263-264 T.) **VOA**

Includes tables which show the effect of heating flour and starch in a vacuum as compared with whole wheat grains.

785. Blake, J. C. Digestibility of bread. 3. Erythro-dextrin in starch hydrolysis. (American Chemical Society, Journal, Easton, 1918, v. 40, p. 623-636.) **PKA**

Studies roasting of starch treated with dilute acids and starch boiled with dilute HCl; the decomposition products were estimated by observing the intensity of iodine coloration against Lovibond color glasses by means of a Dubosq colorimeter. Defines and describes "artificial starch," Lintner's soluble starch, amylo-dextrin, erythro-dextrin and erythramylum.

Abstract in *Chem. abst.*, 1918, v. 12, p. 928; *Chem. Zentr.*, 1918, p. 383; *Bull. soc. chim. Paris*, 1918, série 4, tome 23, p. 349.

786. Brann, Albert. The effect of dissolved substances on the velocity of crystallization of water. (American Chemical Society, Journal, Easton, 1918, v. 40, p. 1168-1184.) **PKA**

Includes a determination of the retarding effect of starch and dextrin on the velocity of crystallization of water. The action is attributed to the formation of hydrates.

Abstract in *Chem. Zentr.*, 1919, Bd. 1, p. 74.

787. Moore, William C., and J. B. DAVIES. A gas dilatometer for ascertaining decomposition points. The decomposition points of sucrose, d-glucose, and soluble starch. (Metallurgical and chemical engineering, New York, 1918, v. 18, p. 301-302.) **VOA**

The observed decomposition point for soluble starch was 214°.

Abstract in *Chem. abst.*, 1918, v. 12, p. 1605.

788. Doumer, E. Sur l'amidon paraffiné. (Société de biologie, Comptes rendus, Paris, 1919, tome 82, p. 443-444.) **QAA**

The paraffin is dissolved in a volatile solvent, pulverized starch stirred in, and the solvent evaporated rapidly. The starch thus obtained is used in digestion experiments.

Abstract in *Chem. Zentr.*, 1919, Bd. 3, p. 390.

Starches and Dextrins, continued.

General Chemical Characteristics, continued.

789. Mellanby, John. Composition of starch. 1. Precipitation by colloidal iron. 2. Precipitation by iodine and electrolytes. (Biochemical journal, London, 1919, v. 13, p. 28-36.)

Available in Library of the New York Academy of Medicine.

Finds that starch may be divided into 3 fractions according to their precipitability by colloidal iron. Gives evidence that a quantitative reaction takes place between starch and ionized iodine.

Abstract in *Jour. chem. soc.*, 1919, v. 116, part 1, p. 311; *Chem. Zentr.*, 1919, Bd. 3, p. 256.

790. Sallinger, Hermann. Systematische Alterungsversuche mit den Lösungen verschiedener Stärkearten unter genauer Berücksichtigung des Zeitfaktors. Das Zeitgesetz der Alterung von Stärkelösungen. (Kolloid-Zeitschrift, Dresden and Leipzig, 1919, Bd. 25, p. 111-115.) **PKA**

The aging of various starch solutions was followed by precipitating the starch gel at intervals by means of ptyalin and weighing it after drying at 110°. It is found that the relationship between the logarithm of the weight of the gel and the logarithm of the time of aging is represented by a straight line.

Abstract in *Jour. chem. soc.*, 1920, v. 118, part 1, p. 15; *Chem. Zentr.*, 1919, Bd. 3, p. 861.

791. Viale, G. Recherche sui fenomeni fotodinamici. 2. Reazioni fotocatalitiche e reazioni biologiche, fotobiologiche. (Archivio di scienze biologiche, Napoli, 1919-20, v. 1, p. 259-265.)

Available in Library of the New York Academy of Medicine.

Includes a study of the action of certain salts of uranium, iron and manganese on a mixture of 4 volumes 1% starch solution and 1 volume 1% KI solution.

Abstract in *Physiological abstracts*, London, 1921-22, v. 6, p. 117-118; *Chem. abst.*, 1922, v. 16, p. 2872.

792. Abelous, J. E., and J. Aloy. Hydrolyses digestives par ionisation mécanique de l'eau. (Académie des sciences, Comptes rendus, Paris, 1920, tome 170, p. 1012-1014.) ***EO**

Partial hydrolysis of starch was noted.

Abstract in *Chem. abst.*, 1920, v. 14, p. 2497; *Chem. Zentr.*, 1920, Bd. 3, p. 774; *Bull. soc. chim. France*, 1920, série 4, tome 27, p. 635.

793. Blake, J. C. The individuality of erythrodextrin. (American Chemical Society, Journal, Easton, 1920, v. 42, p. 2673-2678.) **PKA**

A continuation of earlier attempts to prepare pure erythrodextrin for the purpose of

standardizing amylolytic activity. Carrying out a series of precipitations by alcohol and by ammonium sulphate solution with subsequent desiccation over calcium chloride, obtains a product completely free from amyloextrin.

Abstract in *Chem. abst.*, 1921, v. 15, p. 678; *Chem. Zentr.*, 1921, Bd. 1, p. 563.

794. Knecht, Edmund. The prolonged action of a moderate heat on bleached cotton and some other substances. (Society of Dyers and Colourists, Journal, Bradford, 1920, v. 36, p. 195-198.) **†VLG**

Starch exposed in a sealed tube at 80-100° remained white for several days, but after a week developed a cream color. After 14 days the color of the bulk had become still darker and on the sides of the tube patches of a rich brown had begun to develop.

Reprinted in *Fuel in science and practice*, London, 1924, v. 3, p. 106-108, *VHVA*.

Abstract in *Chem. Zentr.*, 1924, Bd. 2, p. 1033.

795. Lindner, Paul. Kartoffelstärkekörner als Pilznester. (Zeitschrift für Spiritusindustrie, Berlin, 1920, Jahrg. 43, p. 213.) **††VTZA**

On examining microscopically a moldy potato it was found that numbers of the starch grains had been invaded by the mold filaments (species undetermined), which, in many cases, had knotted into compact masses in the grains. The latter appeared dark-spotted by transmitted light. — *Chem. abst.*

796. Bergmann, Max, and FRANZ BECK. Notiz über Acetolyse von Polysacchariden. (Deutsche chemische Gesellschaft, Berichte, Berlin, 1921, Jahrg. 54, p. 1574-1578.) **PKA**

Note that when the mixture, which is formed by saturating acetic anhydride with HBr, is allowed to act upon rice starch an 85% yield of acetylbromoglucose is obtained. Maltose, when similarly treated, also yields acetylbromoglucose.

Abstract in *Chem. abst.*, 1921, v. 15, p. 3628; *Chem. Zentr.*, 1921, Bd. 3, p. 779; *Bull. soc. chim. France*, 1921, série 4, tome 30, p. 1333-1334.

797. Samec, Max. Zur Chemie der Polysaccharide. (Biochemische Zeitschrift, Berlin, 1921, Bd. 113, p. 255-256.) **PPB**

Criticizing the recent article of Herzfeld and Klinger, maintains that starch is considerably modified by the prescribed treatment with alkali, that iodine colorations are not due to differences in degree of dispersion, that formaldehyde does not effect the disaggregation of starch, and that it is universally known that sugars are produced in the diastatic decomposition of starch.

798. Scheringa, K. Die Adsorption von Cellulose (Filtrierpapier) und Stärke; ein

*Starches and Dextrins, continued.**General Chemical Characteristics, continued.*

Beitrag zur Kenntnis der Durchtränkung. (Auszug.) (Chemisches Zentralblatt, Leipzig und Berlin, 1921, Bd. 1, p. 131.) **PKA**

Starch, a much more disperse system than cellulose, shows selective adsorption; negative with NaCl, positive with CuSO₄ in very dilute solution, but negative in more concentrated solution.

Also abstracted in *Chem. abst.*, 1921, v. 15, p. 100.

799. Traube, Wilhelm. Zur Kenntnis der alkalischen Kupferoxydlösungen und der Kupferoxydammincelluloselösungen. (Deutsche chemische Gesellschaft, Berichte, Berlin, 1921, Jahrg. 54, p. 3220-3232.) **PKA**

Notes that solutions of alkali or ethylene diamine containing starch dissolve a greater amount of Cu(OH)₂ than the solutions alone. These results are similar to those obtained with other polyvalent alcohols. When brought into contact with ethylenediamine solution saturated with Cu(OH)₂, ordinary starch swells and becomes intensely blue, the color remaining even after repeated washing with water. The substance contains N, and possibly is a definite compound of alkoxide nature.

Abstract in *Jour. chem. soc.*, 1922, v. 122, part 1, p. 115.

800. Baudisch, Oskar, and HARRY J. DEUEL. Studies on acetol. 1. A new test for carbohydrates. (American Chemical Society, Journal, Easton, 1922, v. 44, n. 1585-1587.) **PKA**

Find the simpler carbohydrates decompose on distillation with NaHCO₃ yielding as one of the products acetol, which is recognized by an intense bluish fluorescence when heated with o-amino benzaldehyde. Note that dextrin responds to the test. Starch and glycogen, when similarly distilled, yield no acetol nor could any be obtained from starch which had been oxidized with Na-pentacyano-aqua ferroate and oxygen.

801. Biltris, A. N. H. Separating starch from a paste. (Chemical abstracts, Easton, 1922, v. 16, p. 3366.) **PKA**

The material, which consisted of starch and MgCl₂, was suspended in water and the MgCl₂ solution separated by filtration.

802. Findlay, Alexander, and C. ROSEBOURNE. The decomposition and stability of ammonium nitrate in the presence of oxidizable matter. (Society of Chemical Industry, Journal, London, 1922, v. 41, p. 58-59T.) **VOA**

Find that the decomposition of ammo-

nium and urea nitrates is markedly accelerated by the presence of starch.

Abstract in *Chem. abst.*, 1922, v. 16, p. 1319.

803. Firth, James B. The sorption of iodine by carbons prepared from carbohydrates. (Chemical Society of London, Journal, 1923, v. 123, p. 323-327.) **PKA**

Determines ash, density and I sorption of carbons prepared from various carbohydrates. The carbons of dextrin and of rice, wheat and potato starches are included.

804. Kunz-Krause, Hermann. Über das Dextrinozol, den Geruchsträger gewisser Handelsdextrine und über "Ozole" im allgemeinen. (Deutsche pharmaceutische Gesellschaft, Berichte, Berlin, 1923, Jahrg. 33, p. 149-155.)

Available in Library of Columbia College of Pharmacy.

By steam distillation of dextrins obtains crystals which resemble myristic acid. Concludes that the dextrin scent of commercial dextrins is due to a readily volatile solid constituent, dextrinozol.

Abstract in *Chem. abst.*, 1923, v. 17, p. 3402; *Chem. Zentr.*, 1923, Bd. 3, p. 612.

805. Ross, J. H., and J. M. PAYNE. The action of chloral on cellulose. (American Chemical Society, Journal, Easton, 1923, v. 45, p. 2363-2366.) **PKA**

Find that the action of chloral hydrate on starch and cellulose gives rise to identical dichloralglucoses.

Abstract in *Chem. Zentr.*, 1924, Bd. 1, p. 1510.

806. Semmens, Elisabeth S. Some biochemical effects of polarized light. (Chemistry and industry, London, 1923, v. 42, p. 954R.) **VOA**

The enzymic hydrolysis of starch is accelerated by polarized light. Certain results also indicate that starch grains may be hydrolyzed without the presence of amylase, provided the intensity of light is sufficiently great.

807. Tadokoro, Tetsutaro, and YUKIHIKO NAKAMURA. On the difference between the adsorptive powers of charcoal from common and glutinous starches. (Journal of biochemistry, Tokyo, 1923, v. 2, p. 239-250.)

Available in Library of the New York Academy of Medicine.

The starches were washed successively with NaOH and water and heated for 2 hours at 460°. Charcoal from glutinous starches, in general, exhibited the greatest adsorptive power in I-KI solutions. Glutinous starch required a larger quantity of tannin for coagulation.

Abstract in *Chem. abst.*, 1923, v. 17, p. 1911; *Chem. Zentr.*, 1924, Bd. 2, p. 1166; *Bull. soc. chim. France*, 1923, série 4, tome 34, p. 2059.

Starches and Dextrins, continued.

General Chemical Characteristics, continued.

80. Tadokoro, Tetsutaro, and SHOICHI SATO. The differences between some colloidal properties of common and glutinous rice starch. (Tokio.—Imperial University: College of Agriculture, Journal, 1923-24, v. 2, p. 1-65.)

Available in Library of the Department of Agriculture.

The following properties are investigated: swelling of granules in I-KI solutions, swelling in NaOH solutions, resistance to H_2SO_4 , nature of I colorations, viscosity of neutral and alkaline solutions, ease of coagulation of sols, change of surface tension in addition of tannin, gold numbers of sols, appearance of gels under the ultramicroscope, adsorptive power of charcoals and relative dispersion of sols. Marked differences are noted in some cases.

Abstract in *Chem. abst.*, 1923, v. 17, p. 3634.

81. Zechmeister, László. Zur Einwirkung von Acetylbromid auf Cellulose. (Deutsche chemische Gesellschaft, Berichte, Berlin, 1923, Jahrg. 56, p. 573-578.) **PKA**

Notes that starch yields 75% acetobromulose when treated with commercial acetyl bromide in a sealed tube. The process is complicated by the simultaneous actions of acetyl bromide and HBr.

82. Costa, Domenico. Sul potere assorbente dell'amido per i gas e sulla sua azione sopra i magnesilderivati. (Gazzetta chimica italiana, Roma, 1924, anno 54, p. 207-211.) **PKA**

Treats dried rice starch with EtMgBr in ether for 24 hours at a temperature below 5° . Obtains a monobromomagnesium derivative of starch containing 1 molecule of ether. Investigates adsorption of HCl , SO_2 , H_2 , CO_2 and O_2 by starch.

Abstract in *Chem. abst.*, 1924, v. 18, p. 3175; *Chem. Zentr.*, 1924, Bd. 2, p. 458.

83. Lasnitzki, A., and L. FARMER LOEB. Untersuchungen über die Adsorption und hydrophile Kolloide. (Biochemische Zeitschrift, Berlin, 1924, Bd. 146, p. 96-107.) **PPB**

The adsorption of butyric and isovaleric acids by starch and gelatin was studied, with surface tension as a measure of unadsorbed acid. At ordinary temperatures the Freundlich adsorption coefficient applied; at 0° adsorption was slight or entirely lacking. With increasing concentration of adsorbent, a basal adsorption value was approached.—*Chem. abst.*

Abstract in *Chem. Zentr.*, 1924, Bd. 2, p. 161.

84. Lebeau, P. Sur le fractionnement thermique des produits gazeux de la pyro-

généation de quelques composés définis. (Académie des sciences, Comptes rendus, Paris, 1924, tome 178, p. 2256-2259.) ***EO**

Starch is included in the investigations.

Abstract in *Chem. Zentr.*, 1924, Bd. 2, p. 1471.

85. Rosenthaler, L., and M. STAUFFER. Beobachtungen an Stärkekörnern. (Auszug.) (Chemisches Central-Blatt, Leipzig und Berlin, 1924, Bd. 1, p. 451-452.) **PKA**

The swelling qualities of starch grains towards 0.16 N KOH and toward 15.5% HCl in about 24 kinds of starch-bearing seeds, tubers and roots are tabulated, the results being noted respectively at once, after 10 and after 30 minutes. There seem to be qualitative differences, e.g., between rye and wheat starch, the former being more resistant, which is quite evident with 0.333 N KOH. Large grains are more easily attacked than smaller ones. The behavior perhaps lends itself to analytical use. Adsorption of certain dyes seem to show only quantitative differences, but no selective effects.—*Chem. abst.*

86. Vintilescu, J., and D. FALTIS. Action of iodine on some carbohydrates. (Extract.) (Chemical abstracts, Easton, 1924, v. 18, p. 1475.) **PKA**

A number of carbohydrate solutions, including dextrin solution, are heated with powdered I in a sealed tube and the resulting products investigated.

Also abstracted in *Jour. soc. chem. ind.*, 1924, v. 43, p. 190B; *Chem. Zentr.*, 1924, Bd. 1, p. 1358.

87. Viale, G. Différenciation entre phénomènes photochimiques et phénomènes photodynamiques. (Archives italiennes de biologie, Pisa, 1924, tome 73, p. 19-23.) **QAA**

Experiments with the action of light on starch-iodide-quinine-bisulfate solutions show that when the fluorescence of the system is lessened by increasing additions of NaCl, the rapidity of the reaction is correspondingly retarded, indicating that the liberation of I is brought about through the luminescence of the system, and not through the nature of the substance added.—*Chem. abst.*

88. Zwikker, J. J. L. Overzicht over de vorderingen in de studie der polysacchariden, gedurende de laatste jaren. (Chemisch weekblad, Amsterdam, 1924, jaarg. 21, p. 349-352.)

Available in Library of the Chemists' Club.

A critical review.

89. Alsberg, Carl L., and E. P. GRIFFING. Effect of fine grinding upon flour. (Cereal

Starches and Dextrins, continued.

General Chemical Characteristics, continued.

chemistry, St. Paul, 1925, v. 2, p. 325-344.)

VPMA

Conclude that overgrinding flour injures the starch granules so that a part of the starch swells and disperses when the flour is doughed. One result is an increase of the cold water extract from dispersed starch. Another is increased enzymic starch conversion in the flour from which an increased rate of fermentation follows. Severe overgrinding injures flour for baking purposes despite increased adsorption due to swelling of starch granules. Evidence is presented that it also injures the gluten. Moderate overgrinding may injure the starch granules without much affecting the gluten. In the case of one flour examined, absorption was appreciably increased without material effect upon the baking strength.

Abstract in *Chem. abst.*, 1926, v. 20, p. 1283.

818. Alsberg, Carl L., and E. E. PERRY. Further studies on the effect of fine grinding upon starch grains. (*Journal of biological chemistry*, Baltimore, 1925, v. 63, p. lxvi-lxvii.)

PPB

Starch grains which have been ground in a pebble mill are still birefringent although they do not exhibit the black cross under the polarizing microscope. The grains swell immediately when placed in contact with cold water and are dispersed in the water to a considerable extent. They stain instantaneously in aqueous solutions of a number of dyestuffs although uninjured grains are stained with the greatest difficulty. Solutions prepared by extracting ground starch in water at room temperature deposit on standing a flocculent precipitate insoluble in cold water. However, a portion of the material remains in solution even after weeks of standing; this may be precipitated by alcohol and the precipitate can be redissolved in cold water.

Abstract in *Chem. abst.*, 1925, v. 19, p. 3612.

818A. Bakhuyzen, H. L. van de Sande. Starch grains of wheat considered as partially dehydrated amylose. (*Society for Experimental Biology and Medicine, Proceedings*, New York, 1925, v. 23, p. 195-197.)

QAA

About 60% of wheat starch grains is soluble in cold water when ground for several days in a pebble mill. It is assumed that the grain consists of concentric rings of α -amylose which is less dehydrated and is insoluble in water at 100°, and β -amylose which is more dehydrated and is soluble in cold water. There is only a quantitative difference in hydration between them.—*Chem. abst.*

819. Baly, E. C. C., and E. S. SEMMENS. Selective action of polarised light upon starch grains. (*Nature*, London, 1925, v. 116, p. 817.)

OA

820. Fierz-David, Hans, and MAX HANNIG. Über die Destillation von Cellulose, Holz und ähnlichen Stoffen unter Wasserstoffdruck mit Katalysatoren. (*Helvetica chimica acta*, Basileae et Genevae, 1925, v. 8, p. 900-923.)

PKA

In the dry distillation of cellulose, wood, starch or lignin under a hydrogen pressure of 300 atmospheres, the hydrogen appeared to have no influence on the course of the reaction. However with nickel oxide and hydrogen together the substances were converted almost quantitatively into liquid and gaseous products.

Abstract in *Chemical trade journal*, London, 1925, v. 77, p. 269.

821. Jones, W. Neilson. Polarized light and starch grains. (*Annals of botany*, London, 1925, v. 39, p. 651-653.)

QEA

Questioning the conclusion of Baly and Semmens, is unable to find evidence that polarized light affects starch, either with or without the presence of amylase.

Abstract in *Chem. abst.*, 1925, v. 19, p. 3512.

822. Knight, Nina. Glycerinum amyli, B. P. (*Chemist and druggist*, London, 1925, v. 102, p. 496.)

Available in Library of Columbia College of Pharmacy.

As the presence of glycerine raises the temperature at which starch forms a clear or translucent jelly with water (1:10), this temperature (110° for wheat starch, 115° for rice and maize) cannot be attained by the use of the water bath prescribed by the British Pharmacopoeia. Heats the mixture in an earthenware jar immersed in a bath of CaCl_2 in water (1:2).—*Chem. abst.*

823. Morris, Leslie E. Mildew in cotton goods. 2. The growth of mould fungi on sizing and finishing materials. (*British Cotton Industry Research Association, Shirley Institute memoirs*, Didsbury, 1925, v. 4, no. 12, p. 129-150.)

VLLA

Finds that the dextrins and wheat, rice, and cassava flours permit the most rapid growth and production of spores. An intermediate group is formed by wheat and maize starches, gum tragacanth, and soluble starch. The substances least liable to mildew are tapioca flour (cassava starch), sago, and farina.

824. Naudain, G. G. Study of the properties of wheat starch and the baking qualities of the flour. (*American food journal*, New York, 1925, v. 20, p. 250-251.)

VTa

Abstract in *Chem. abst.*, 1925, v. 19, p. 2245.

Starches and Dextrins, continued.

General Chemical Characteristics, continued.

825. Petit, Paul. Sur la liquéfaction de l'empois d'amidon. (Académie des sciences, Comptes rendus, Paris, 1925, tome 181, p. 259-260.) *EO

Abstract in *Chem. abst.*, 1925, v. 19, p. 3612.

826. Pringsheim, Hans. Zur Kenntnis der Flechtenstärke. (Zeitschrift für physiologische Chemie, Hoppe-Seyler's, Berlin und Leipzig, 1925, Bd. 144, p. 241-242.) PKA

Abstract in *Chem. Zentr.*, 1925, Bd. 2, p. 913.

826A. — Über die Chemie komplexer Naturstoffe. (Naturwissenschaften, Berlin, 1925, Bd. 13, p. 1084-1090.) OA

A review. Gives evidence that starch is

built up by secondary valence polymerization.

827. Swanson, C. O. A theory of colloid behavior in dough. (Cereal chemistry, St. Paul, 1925, v. 2, p. 265-275.) VPMA

Abstract in *Chem. abst.*, 1926, v. 20, p. 74.

828. Thompson, Phebe K. Recovery of small amounts of zinc from biologic material ashed by the incineration process. (Journal of industrial hygiene, Boston, 1925, v. 7, p. 358-370.)

Available in Library of Columbia University.

Starch is included among materials incinerated.

REACTIONS WITH IODINE

829. Colin, and GAULTIER DE CLAUDRY. Ueber die Verbindungen der Jodine mit den Pflanzen- und den thierischen Körpern. (Annalen der Physik, Gilbert's, Leipzig, 1814, Bd. 48, p. 297-304.) PAA

Find that addition of iodine to starch results in the successive colorations, violet, blue and bluish-black. The product is soluble in water with an intense blue coloration, which disappears on boiling. This behavior is characteristic of all starches examined. Study action of the following reagents on the starch-I: hydrogen sulphide, chlorine, sodium hydroxide, ammonia, potassium carbonate, alcohol and sulphurous, sulphuric, nitric and hydrochloric acids.

830. Stromeier. Ein sehr empfindliches Reagens für Jodine, aufgefunden in der Stärke (Amidon). (Annalen der Physik, Gilbert's, Leipzig, 1815, Bd. 49, p. 146-153.) PAA

Studies sensitivity of the starch-I reaction.

831. Lassaigue, J. L. Note sur l'influence qu'exerce la température sur la solution l'iodure d'amidine. (Annales de chimie et de physique, Paris, 1833, tome 53, p. 109-110.) PAA

832. Leroy. Action of iodine on starch. (Abstract.) (Philosophical magazine, London, 1834, v. 4, p. 313.) OA

Finds water is necessary for appearance of the blue I coloration.

833. Jonas, L. Über die Reaction des Iods auf Stärkehydrate mittelst Kattun. (Annalen der Pharmacie, Liebig's, Heidelberg, 1836, Bd. 20, p. 40-41.) PKA

Describes use of calico strips impregnated with starch.

834. Lassaigue, J. L. Sur l'iodure d'amidine. (Journal de chimie médicale, Paris, 1838, série 2, tome 4, p. 209-212.)

Available in Library of Surgeon General's Office.

Abstract in *Philosophical magazine*, 1838, v. 13, p. 312.

835. Boettger, R. Neue Bereitungsweise der Jodstärke. (Annalen der Pharmacie, Liebig's, Heidelberg, 1840, Bd. 33, p. 338-340.) PKA

A small amount of starch is dissolved in KI solution, a calculated amount of Cl water added and the resulting precipitate of starch-I collected and washed. The method avoids possible contamination with other substances.

836. Jaquelain, V. A. Mémoire sur la fécule. (Annales de chimie et de physique, Paris, 1840, tome 73, p. 167-207.) PAA

Carries out microscopic observations on starch grains at various temperatures up to 200°. Observations on blue starch iodide indicate that the combination is not a chemical phenomena.

837. Harting, P. Grenzen der Empfindlichkeit einiger Reagentien. (Journal für praktische Chemie, Leipzig, 1841, Bd. 22, p. 45-47.) PKA

1. Empfindlichkeit der Stärke, als Reagens auf Jod.

Also in *Philosophical magazine*, London, 1841, v. 18, p. 604-605.

838. Lassaigue, J. L. Note sur la préparation d'un sirop à base d'iodure d'amidon soluble. (Journal de chimie médicale, Paris, 1851, série 3, tome 7, p. 180-181.)

Available in Library of Surgeon General's Office.

Starches and Dextrins, continued.

Reactions with Iodine, continued.

839. Magnes-Lahens. De l'iodure d'amidon soluble et du sirop de même nom. (*Journal de pharmacie et de chimie*, Paris, 1851, série 3, tome 19, p. 243-250.) **WTA**

Gives details of the preparation of starch-I for medical uses.

840. — De l'iodure d'amidon, de sa décoloration par la chaleur et le charbon végétal, et de l'action de l'iode sur le charbon et la sciure de bois. (*Journal de pharmacie et de chimie*, Paris, 1852, série 3, tome 21, p. 13-24.) **WTA**

841. Seput, Ant. Sur l'iodure d'amidon soluble, et procédé pour le préparer. (*Journal de pharmacie et de chimie*, Paris, 1852, série 3, tome 21, p. 202-205.) **WTA**

842. Soubeiran, J. Léon. Sur l'iodure d'amidon soluble et sur le sirop d'iodure d'amidon. (*Journal de pharmacie et de chimie*, Paris, 1852, série 3, tome 21, p. 329-337.) **WTA**

Discusses preparation of starch-I for medical uses.

843. Béchamp, A. Note sur la coloration de l'amidon par l'iode. — Méthode analytique pour retrouver la fécule lorsque sa présence est masquée par certaines substances organiques. (*Journal de pharmacie et de chimie*, Paris, 1855, série 3, tome 27, p. 406-413.) **WTA**

844. — Sur la coloration de l'amidon par l'iode. (*Journal de pharmacie et de chimie*, Paris, 1855, série 3, tome 28, p. 303-306.) **WTA**

845. Blondlot. Note sur la propriété de l'amidon de se colorer en bleu par l'iode. (*Journal de pharmacie et de chimie*, Paris, 1855, série 3, tome 28, p. 45-46.) **WTA**

846. Pisani, F. Note sur l'action de l'iodure d'amidon sur différents sels. (*Académie des sciences, Comptes rendus*, Paris, 1856, tome 43, p. 1118-1119.) ***EO**

Abstract in *Chem. Centr.*, 1857, p. 107; *Jahresber. Chem.*, 1856, p. 669; *Jour. prakt. Chem.*, 1857, Bd. 70, p. 382-383.

847. Fresenius, R. Einfluss der Temperatur und einiger anderer Umstände auf die Empfindlichkeit der Jodamylum-Reaction. (*Annalen der Chemie und Pharmacie*, Leipzig und Heidelberg, 1857, Bd. 102, p. 184-189.) **PKA**

The color intensity of the starch-I reaction increases with a decrease in temperature.

848. Henry, O., and E. Humbert. Note sur la recherche de l'iode par l'amidon. (*Académie des sciences, Comptes rendus*, Paris, 1858, tome 47, p. 298.) ***EO**

Note that an excess of chlorine has the effect of decolorizing blue starch-I and that the color may be restored by treatment with nascent hydrogen.

Abstract in *Jour. prakt. Chem.*, 1859, Bd. 76, p. 499.

849. Baudrimont, E. Explication des phénomènes que présente l'iodure bleu d'amidon dissous lorsqu'il est chauffé, puis refroidi. (*Académie des sciences, Comptes rendus*, Paris, 1860, tome 51, p. 825-827.) ***EO**

Abstract in *Jour. prakt. Chem.*, 1861, Bd. 84, p. 378-379; *Jahresber. Chem.*, 1860, p. 501; *Soc. chim. Paris, Répertoire de chimie appliquée*, 1860, tome 2, p. 392.

850. Duroy, J. Sur un iodure neutre et incolore d'amidon. (*Académie des sciences, Comptes rendus*, Paris, 1860, tome 51, p. 1031.) ***EO**

Also in *Journal de pharmacie et de chimie*, Paris, 1861, série 3, tome 39, p. 94-95, **WTA**.

Abstract in *Bull. soc. chim. Paris*, 1861, année 3, p. 71; *Jour. prakt. Chem.*, 1861, Bd. 82, p. 382.

851. Reinsch, Hugo. Ueber ein eigenthümliches Verhalten von Brom und Chlor gegen Iodstärke. (Auszug.) (*Chemisches Central-Blatt*, Leipzig, 1860, p. 1023.) **PKA**

Also abstracted in *Jahresber. Chem.*, 1860, p. 501.

852. Personne, J. Décoloration de l'iodure d'amidon. (*Journal de pharmacie et de chimie*, Paris, 1861, série 3, tome 39, p. 49-51.) **WTA**

The decoloration of starch-I is due to volatilization of a portion of the I, to formation of a colorless compound of starch with I and to conversion of a portion of the starch to sugar.

Abstract in *Bull. soc. chim. Paris*, 1861, année 3, p. 71; *Jahresber. Chem.*, 1860, p. 501.

853. Pohl, J. J. Beiträge zur Kenntniss der Eigenschaften der Stärke. 1. Ueber das Verhalten einiger Stärkearten gegen Wasser, Alkohol und Jodlösungen. (*Journal für praktische Chemie*, Leipzig, 1861, Bd. 83, p. 35-41.) **PKA**

Regarding the starch-I reaction, believes that hot water has a greater affinity than starch for iodine, whereas with cold water the reverse is true.

Abstract in *Jahresber. Chem.*, 1861, p. 715-716.

854. Schoenbein, C. F. Beiträge zur nähern Kenntniss des Sauerstoffs und der einfachen Salzbildner. (*Journal für praktische Chemie*, Leipzig, 1861, Bd. 84, p. 402-406.) **PKA**

Teil 4. Ueber das Verhalten des Jods

Starches and Dextrins, continued.

Reactions with Iodine, continued.

zum Stärkekleister und reinem Wasser bei höherer Temperatur.

Believes that starch-I is a very definite chemical compound and doubts the existence of a colorless starch-I.

855. Goppelsroeder, Friedrich. Die Iodstärke-Reaction maskirende Eigenschaft gewisser unorganischer Substanzen. (Annalen der Physik und Chemie, Poggen-dorff's, Leipzig, 1863, Bd. 119, p. 57-64.)

PAA

Abstract in *Bull. soc. chim. Paris*, 1863, tome 5, p. 615; *Jour. prakt. Chem.*, 1863, Bd. 90, p. 312.

856. Guichard, Petrus. Action de l'iode sur l'amidon. (Société chimique de Paris, Bulletin, 1863, tome 5, p. 115-116.)

PKA

Studies action of heat, alcohol, AgNO₃ and KI on blue starch iodide.

Reprinted with minor additions in *Chem. Centr.*, 1863, p. 844-846.

857. Kemper, R. Notiz über Entfärbung des Jodamylums. (Archiv der Pharmacie, Hannover, 1863, Bd. 165, p. 252-254.)

Available in Library of Columbia College of Pharmacy.

Believes that starch-I is a definite chemical compound.

858. Payen, A. Sur l'iodure de potassium. (Académie des sciences, Comptes rendus, Paris, 1865, tome 61, p. 466-473, 512-514.)

***EO**

Notes that starch grains swell to 25-30 times their original volume when placed in a saturated solution of KI or KBr at 22°. Describes experiments which indicate that the disappearance of the blue starch-iodine reaction upon heating is due to the expansion of groups of particles and the reappearance of the coloration upon cooling is due to a contraction of these particles.

Reprinted in further detail in *Annales de chimie et de physique*, 1865, série 4, tome 6, p. 221-235, **PAA**.
Abstract in *Jahresber. Chem.*, 1865, p. 596.

859. Personne, J. Sur la décoloration de l'iodure d'amidon par la chaleur. (Académie des sciences, Comptes rendus, Paris, 1865, tome 61, p. 993-994.)

***EO**

In view of the recent work of Payen (entry 858), the author deems it necessary to recite the theories which he has established in an earlier paper (entry 852).

Abstract in *Bull. soc. chim. Paris*, 1866, nouv. série, tome 5, semestre 1, p. 454.

860. Payen, A. Sur la décoloration, par la chaleur, de l'iodure d'amidon. (Académie

des sciences, Comptes rendus, Paris, 1865, tome 61, p. 1021-1023.)

***EO**

Replying to a recent article by Personne, author calls attention to an earlier article by himself, in which the decoloration of starch-I by heat is attributed to an expansion of amylaceous particles.

861. Pellet, H. Nouvelle théorie de la décoloration de l'iodure d'amidon par la chaleur et de sa coloration par le refroidissement. (Société chimique de Paris, Bulletin, 1867, tome 7, p. 147.)

PKA

Abstract in *Zeitschrift für Chemie*, Leipzig, 1867, Jahrg. 10, p. 352.

862. Petit, A. Sur l'iodure d'amidon soluble et sa décoloration par la chaleur. (Journal de pharmacie et de chimie, Paris, 1870, série 4, tome 12, p. 86-89.)

WTA

863. Griessmayer, Viktor. Ueber das Verhalten von Stärke und Dextrin gegen Jod und Gerbsäure. (Annalen der Chemie und Pharmacie, Leipzig and Heidelberg, 1871, Bd. 160, p. 40-56.)

PKA

Studies sensitiveness of I coloration and precipitability by tannin over a period of 10 days. Concludes that filtered starch solution is in a continuously changing condition. The dextrins appear to have a greater affinity for I than starch.

Condensed in *Jour. chem. soc.*, 1872, v. 25, p. 72-74; *Wag. Jahr.*, 1871, Jahrg. 17, p. 559-563.

Abstract in *American chemist*, 1871-72, v. 2, p. 305; *Bull. soc. chim. Paris*, 1872, nouv. série, tome 17, semestre 1, p. 60-61.

864. Duclaux, E. Sur l'iodure d'amidon. (Académie des sciences, Comptes rendus, Paris, 1872, tome 74, p. 533-534.)

***EO**

The formation of blue starch-I is considered to be a simple case of molecular adhesion. The material does not have a constant composition and its formation is dependent on the equilibrium between the water, starch and iodine.

Reprinted in further detail in *Annales de chimie et de physique*, Paris, 1872, série 4, tome 25, p. 264-284.

Abstract in *Jour. chem. soc.*, 1872, v. 25, p. 687-689; *Bull. soc. chim. Paris*, 1872, nouv. série, tome 17, semestre 1, p. 272; *Wag. Jahr.*, 1872, Jahrg. 18, p. 473.

865. Husson. Sur l'iodure d'azote. (Académie des sciences, Comptes rendus, Paris, 1872, tome 75, p. 549-551.)

***EO**

Notes that starch, placed in contact with nitrogen iodide, gradually becomes blue as the nitrogen iodide undergoes decomposition.

Abstract in *Jour. chem. soc.*, 1873, v. 26, p. 46; *Bull. soc. chim. Paris*, 1872, tome 18, p. 453; *Ber.*, 1872, Jahrg. 5, p. 830.

866. Knab, Oscar. Über das Verhalten des Jods zur Stärke bei Gegenwart von Dextrin und Nachweis der Stärke in Bierwürze und

Starches and Dextrins, continued.

Reactions with Iodine, continued.

Bier. (Abgekürzt.) (Chemisches Central-Blatt, Leipzig, 1872, p. 492-496.) **PKA**

Duplicate summary in *Wag. Jahr.*, 1872, Jahrg. 18, p. 566-571.

867. Meyer, Arthur. Zu F. W. Dafert's "Über Stärkekörner welche sich mit Jod rot färben." (Deutsche botanische Gesellschaft, Berichte, Berlin, 1872, Jahrg. 5, p. 171-181.)

Available in Library of Columbia University.

Abstract in *Chem. Centr.*, 1887, p. 989; *Jahresber. Chem.*, 1887, p. 2264-2265.

868. Personne, J. Sur l'iodure d'amidon. (Académie des sciences, Comptes rendus, Paris, 1872, tome 74, p. 617.) ***EO**

Disputing priority of recent conclusions of Duclaux (*entry 864*), refers to an earlier article by himself.

869. Sonstadt, E. Note on the compound of starch with iodine. (Chemical news, London, 1873, v. 28, p. 248.) **PKA**

Finds that with a strongly dried, iodized starch, four-fifths of the iodine is driven off by charring at a red heat, and one-fifth of the iodine remains with the charcoal formed.

Abstract in *Jahresber. Chem.*, 1873, p. 828.

870. Vogel, August. Jodstärke. (Auszug.) (Jahresbericht der Chemie, Giessen, 1873, p. 829.) **PKA**

Iodine dissolved in absolute alcohol does not give a blue coloration with dried starch.

871. Puchot, E. Observation sur l'iode comme réactif de l'amidon. (Académie des sciences, Comptes rendus, Paris, 1876, tome 83, p. 225-226.) ***EO**

In the presence of albumin an excess of iodine is required for appearance of the blue starch-I coloration.

Abstract in *Jour. chem. soc.*, 1877, v. 31, p. 107; *Bull. soc. chim. Paris*, 1877, nouv. série, tome 27, semestre 1, p. 138; *Chem. Centr.*, 1876, p. 649.

872. Vogel, August. Ueber die Entfärbung des Jodamylons. (Neues Repertorium für Pharmacie, Buchner's, München, 1876, Bd. 25, p. 565-567.)

Available in Library of Surgeon General's Office.

Finds that with increasing concentrations of starch-I, higher temperatures are required for decoloration. Addition of nitric acid or chlorine to solutions which have been decolorized by boiling restores the blue coloration. Starch iodide is decolorized

by sunlight. The behavior of dextrin iodide is similar to that of starch iodide.

Abstract in *Jahresber. Chem.*, 1876, p. 836; *Chem. Centr.*, 1876, p. 738.

873. Bondonneau, Lucien. De l'iodure d'amidon. (Académie des sciences, Paris, Comptes rendus, 1877, tome 85, p. 671-673.) ***EO**

Investigates products obtained when starch-I is heated alone, heated under pressure, heated with water, treated with nascent H, treated with diastase, and when desiccated over H₂SO₄.

Reprinted in *Bull. soc. chim. Paris*, 1877, nouv. série, tome 28, p. 452-454.

Abstract in *Jour. chem. soc.*, 1878, v. 34, p. 22; *Chem. Centr.*, 1877, p. 756; *Wag. Jahr.*, 1877, p. 756; *Jahresber. Chem.*, 1877, p. 899-900.

874. Chastaing, P. Étude sur la part de la lumière dans les actions chimiques et en particulier dans les oxydations. (Annales de chimie et de physique, Paris, 1877, série 5, tome 11, p. 145-223.) **PA A**

On p. 207 notes that starch-I is decolorized by white light, the most effective rays being the yellow, green, and red. Violet rays seem to inhibit decolorization.

875. Pellet, H. Sur l'iodure d'amidon. Théorie de sa décoloration par la chaleur et de sa recoloration par le refroidissement. (Moniteur scientifique du docteur Quesneville, Paris, 1877, série 3, tome 7, p. 988-990.)

Available in Library of Columbia University.

Abstract in *Jahresber. Chem.*, 1877, p. 898.

876. Dafert, F. W. Zur Kenntniss der Stärkearten. (Landwirtschaftliche Jahrbücher, Berlin, 1885, Jahrg. 14, p. 837-839.)

Available in Library of Columbia University.

A starch occurring in China gives a reddish brown I coloration; aqueous extractions do not indicate the presence of dextrin.

Abstract in *Jour. chem. soc.*, 1886, v. 50, p. 527; *Central-Blatt für Agrikulturchemie*, Biedermann's, Leipzig, 1886, Jahrg. 15, p. 133-134.

877. Kreusler, U., and F. W. DAFERT. Ueber den sogenannten Klebreis (*Oryza glutinosa* Loveiro). (Auszug.) (Central-Blatt für Agrikulturchemie, Biedermann's, Leipzig, 1885, Jahrg. 14, p. 259-262.)

Available in Library of Department of Agriculture.

Discover presence of starch giving a pure red coloration with iodine.

Abstract in *Jour. chem. soc.*, 1886, v. 50, p. 390.

878. Tomlinson, Charles. On the bleaching of iodide of starch by means of heat. (Philosophical magazine, London, 1885, series 5, v. 20, p. 168-171.) **OA**

Abstract in *Jahresber. Chem.*, 1885, p. 1759.

Starches and Dextrins, continued.

Reactions with Iodine, continued.

879. Beckurts, H., and W. FREYTAG. Über die durch Chlorjod und Bromjod bewirkte violette Färbung der Stärkelösung. (Pharmaceutische Centralhalle, Berlin, 1886, Jahrg. 27, p. 231-232.)

Available in Library of Columbia College of Pharmacy.

Abstract in *Jour. chem. soc.*, 1886, v. 50, part 1, p. 783; *Chem. Centr.*, 1886, p. 454-455; *Wag. Jahr.*, 1886, Jahrg. 32, p. 302.

880. Dafert, F. W. Beiträge zur Kenntnis der Stärkegruppe. (Landwirtschaftliche Jahrbücher, Berlin, 1886, Jahrg. 15, p. 259-276.)

Available in Library of Columbia University.

Abstract in *Jahresber. Chem.*, 1886, p. 1782; *Chem. Centr.*, 1886, p. 574-577; *Wag. Jahr.*, 1886, Jahrg. 32, p. 610.

881. Reinhardt, C. Herstellung einer haltbaren Jodkaliumstärkelösung. (Zeitschrift für analytische Chemie, Wiesbaden, 1886, Jahrg. 25, p. 37.)

PKA

Abstract in *Jahresber. Chem.*, 1886, p. 1896.

882. Dafert, F. W. Über Stärkekörner, welche sich mit Jod roth färben. (Deutsche botanische Gesellschaft, Berichte, Berlin, 1887, Bd. 5, p. 108-114.)

Available in Library of Columbia University.

Abstract in *Jahresber. Chem.*, 1885, p. 1760; *Chem. Centr.*, 1887, p. 567.

883. Mylius, F. Ueber die blaue Jodstärke und die blaue Jodcholsäure. (Zeitschrift für physiologische Chemie, 1887, Bd. 11, p. 306-347.)

PKA

Gives previous views as to nature of starch-I. Compares properties of starch iodide and iodocholic acid. Concludes that starch iodide is an individual compound and not a mixture. See further, *entry 884*.

Abstract in *Chem. Centr.*, 1887, p. 539; *Bull. soc. chim. Paris*, 1887, nouv. série, tome 48, semestre 2, p. 461-464.

884. — Ueber die blaue Jodstärke. (Deutsche chemische Gesellschaft, Berichte, Berlin, 1887, Jahrg. 20, p. 688-695.)

PKA

Evidence that the presence of HI is necessary for production of blue coloration. Determines quantities of I and HI which are absorbed during formation of blue starch iodide. Prepares the Ba, Na, K and Zn compounds of starch iodide. Suggests an analogy between starch-I and iodocholic acid.

Abstract in *Jour. soc. chem. ind.*, 1887, v. 6, p. 63; *Wag. Jahr.*, 1887, Jahrg. 33, p. 866-867; *Bull. soc. chim. Paris*, 1887, nouv. série, tome 48, semestre 2, p. 461-464.

885. Stocks, H. B. Iodide of starch. (Chemical news, London, 1887, v. 56, p. 212-213.)

PKA

886. — Iodide of starch. (Chemical news, London, 1888, v. 57, p. 183-184.)

PKA

Finds dry starch iodide is stable up to 100° and is not acted upon by sunlight. Investigates action of AgNO₃ and of Ag₂SO₄ on starch iodide. Finds blue coloration is destroyed by KMnO₄, Fe filings, bromine, and by warm alcohol.

Abstract in *Jour. chem. soc.*, 1888, v. 54, p. 668.

887. Hoenig, Max, and STANISLAUS SCHUBERT. Über Lichenin. (Monatshefte für Chemie, Wien, 1888, Bd. 8, p. 452-465.)

Available in Library of Columbia University.

Show that the blue iodine coloration produced by lichenin is due to the presence of starch. This modification, termed lichen-starch, is soluble in water and is attacked by diastase.

Abstract in *Jour. chem. soc.*, 1888, v. 54, p. 127.

888. Deventer, Ch. M. van. Über die Jodstärkereaktion. (Auszug.) (Chemisches Central-Blatt, Hamburg und Leipzig, 1888, p. 424.)

PKA

Finds an excess of alkali inhibits the blue-I coloration.

889. Shimoyama, Ynichiro. Beiträge zur Kenntniss des japanischen Klebreises, Mozigome. (Auszug.) (Botanische Jahresbericht, Just's, Berlin, 1889, Jahrg. 14, Abt. 2, p. 315-316.)

Available in Library of Columbia University.

Starch from the glutinous rice gave a red coloration with iodine.

890. Tóth, Julius. Beitrag zur Frage der Konstitution der Jodstärke. (Chemiker-Zeitung, Cöthen, 1891, Jahrg. 15, p. 1523, 1583-1584.)

†† VOA

The starch is dissolved in hot glycerin, diluted with water, iodine-KI solution added, the precipitate separated and iodine in the precipitate determined by titration with thiosulphate. Using wheat, potato and rice starches, obtains compounds containing 22.6-22.8% iodine. KI is not absorbed in the formation of the compound.

Abstract in *Chem. Centr.*, 1892, Bd. 1, p. 27.

891. Rouvier, E. Gaston. De la fixation de l'iode par l'amidon. (Académie des sciences, Comptes rendus, Paris, 1892, tome 114, p. 128-129.)

***EO**

Starch-I is precipitated upon addition of I to a clear solution of starch containing

Starches and Dextrins, continued.

Reactions with Iodine, continued.

NH₄Cl. The precipitate is capable of taking up more I.

Abstract in *Jour. chem. soc.*, 1892, v. 62, p. 578; *Bull. soc. chim. Paris*, 1892, série 3, tome 7, semestre 2, p. 272.

892. — De la fixation de l'iode par l'amidon. (Académie des sciences, Comptes rendus, Paris, 1892, tome 114, p. 749-750.)

*EO

Contradicting the work of Mylius (*entry 884*), finds that I and starch combine in presence of alcohol, when the amount of iodine present is not more than 3% of the total quantity of the iodine.

893. — De la fixation de l'iode par l'amidon. (Académie des sciences, Comptes rendus, Paris, 1892, tome 114, p. 1366-1367.)

*EO

Standardized I solution is treated with an excess of starch solution, saturated NH₄Cl added and the precipitate washed with NH₄Cl solution. The product contained 8.5-9.1% iodine.

Abstract in *Jour. chem. soc.*, 1892, v. 62, p. 1171.

894. Tschirikow, A. D. Über den Einfluss der Temperatur auf die Empfindlichkeitsgrenze der Jodstärkereaktion. (Auszug.) (Chemisches Central-Blatt, Hamburg und Leipzig, 1892, Bd. 1, p. 333.)

PKA

895. Rouvier, E. Gaston. De la fixation de l'iode par l'amidon. (Académie des sciences, Comptes rendus, Paris, 1893, tome 117, p. 281-282.)

*EO

Results indicate that there are 3 definite compounds of starch and iodine.

Abstract in *Jour. chem. soc.*, 1893, v. 64, part 1, p. 683; *Chem. Zentr.*, 1893, Bd. 2, p. 530; *Bull. soc. chim. Paris*, 1894, série 3, tome 11, p. 64.

896. — De la fixation de l'iode par l'amidon. (Académie des sciences, Comptes rendus, Paris, 1893, tome 117, p. 461.)

*EO

Starch and iodine solutions of definite concentrations are mixed, concentrated NaCl added and the iodine in the precipitate determined by titration with thiosulphate. After formation of a compound containing 19.6% I there is no further combination of iodine with starch.

Abstract in *Jour. chem. soc.*, 1894, v. 66, p. 63; *Chem. Zentr.*, 1893, Bd. 2, p. 935; *Bull. soc. chim. Paris*, 1894, série 3, tome 11, p. 186-187.

897. Kuester, Fritz W. Über die blaue Jodstärke und die molekulare Struktur der gelösten Stärke. (Liebig's Annalen der Chemie, Leipzig, 1894, Bd. 283, p. 360-379.)

PKA

Evidence that blue starch iodide is a well defined solid solution of iodine in starch and

that "dissolved" starch is not a true solution but is an emulsion of swollen starch.

Abstract in *Jour. chem. soc.*, 1895, v. 68, part 1, p. 199; *Chem. Centr.*, 1895, Bd. 1, p. 271.

898. Lonnes, Carl. Jodometrische Versuche und Beitrag zur Kenntniss der Jodstärke. (Zeitschrift für analytische Chemie, Wiesbaden, 1894, Jahrg. 33, p. 409-436.)

PKA

Abstract in *Jahresber. Chem.*, 1894, Jahrg. 47, p. 104.

899. Meineke, C. Studien über die Jodstärke-Reaktion. (Chemiker-Zeitung, Cöthen, 1894, Jahrg. 18, p. 157-160.)

††VOA

Makes 19 quantitative determinations of the sensitivity of the starch-iodine reaction as influenced by the presence of various salts. Finds the sensitivity is greatest in the presence of KI.

Abstract in *Jour. chem. soc.*, 1895, v. 68, part 1, p. 79; *Jahresber. Chem.*, 1894, p. 2402; *Chem. Centr.*, 1894, Bd. 1, p. 525.

900. Roberts, C. F. Blue iodide of starch. (American journal of science, New Haven, 1894, series 3, v. 47, p. 422-429.)

OA

Evidence that the presence of HI is necessary for formation of blue starch-iodide. Favors the formula proposed by Mylius (*entry 884*).

Abstract in *Jour. chem. soc.*, 1894, v. 66, part 1, p. 398; *Chem. Centr.*, 1894, Bd. 2, p. 147.

901. Rouvier, E. Gaston. De la fixation de l'iode par l'amidon. (Académie des sciences, Comptes rendus, Paris, 1894, tome 118, p. 743-744.)

*EO

Determines amount of iodine absorbed by rice, wheat and potato starches. The iodine is not present in sufficient quantity to form the compound containing 19.6% iodine, which has been previously described.

Abstract in *Jour. chem. soc.*, 1894, v. 66, part 1, p. 353.

902. Kuester, Fritz W. Ueber die blaue Jodstärke und die blaue Jodcholalsäure. (Deutsche chemische Gesellschaft, Berichte, Berlin, 1895, Jahrg. 28, p. 783-785.)

PKA

A reply to Mylius (*entry 903*).

Abstract in *Jour. chem. soc.*, 1895, v. 68, part 1, p. 322; *Chem. Centr.*, 1895, Bd. 1, p. 1113; *Bull. soc. chim. Paris*, 1896, série 3, tome 16, p. 649.

903. Mylius, F. Jodstärke und Jodcholalsäure. (Deutsche chemische Gesellschaft, Berichte, Berlin, 1895, Jahrg. 28, p. 385-390.)

PKA

A brown starch iodine compound is obtained by addition of iodine to a suspension of starch in zinc iodide or sulphuric acid solution. Further discusses the analogy of blue starch iodide and iodocholeic acid.

Abstract in *Jour. chem. soc.*, 1895, v. 68, part 1, p. 313; *Chem. Centr.*, 1895, Bd. 1, p. 793; *Bull. soc. chim. Paris*, 1895, série 3, tome 14, p. 901-902.

Starches and Dextrins, continued.

Reactions with Iodine, continued.

904. Rouvier, E. Gaston. De la fixation de l'iode par l'amidon de pomme de terre. (Académie des sciences, Comptes rendus, Paris, 1895, tome 120, p. 1179-1180.) *EO

In the presence of excess I, the maximum quantity with which potato starch will combine is 18.6% while the maximum for wheat and rice starch is 19.6%. When I is added in barely sufficient quantity to form the iodide, the potato starch derivative contains 13.5%, while that of wheat and rice contains about 9% I.

Reprinted in *Bull. soc. chim. Paris*, 1895, série 3, tome 13, p. 1038-1039.

Abstract in *Jour. chem. soc.*, 1895, v. 68, part 1, p. 587.

905. Musset, Franz. Zur Konstitution der Jodstärke. (Pharmaceutische Centralhalle, Dresden, 1896, Jahrg. 37, p. 556-557.)

Available in Library of Columbia College of Pharmacy.

Finds starch decomposes certain chemical compounds with formation of starch iodide and that dialysis of starch iodide removes all the iodine as HI.

Abstract in *Chem. Centr.*, 1896, Bd. 2, p. 661.

906. Rouvier, E. Gaston. De la fixation de l'iode par les amidons de blé et de riz. (Académie des sciences, Comptes rendus, Paris, 1897, tome 124, p. 565-566.) *EO

Further hypotheses on earlier experimental work, as to the nature of iodine absorption by starch.

Abstract in *Jour. soc. chem. ind.*, 1897, v. 16, p. 475; *Bull. soc. chim. Paris*, 1897, série 3, tome 17, p. 462; *Chem. Zentr.*, 1897, Bd. 1, p. 804.

907. Harz, C. O. Über Jodstärke. (Auszug.) (Chemisches Central-Blatt, Berlin, 1898, Bd. 1, p. 1018.) PKA

Determines amount of iodine absorbed by rice, potato and wheat starches in both the raw and gelatinized states; average results show an absorption of about 7 and 19% respectively.

908. Friedenthal, Hans. Über chemische Bindung zwischen colloiden und krystalloiden Substanzen. (Centralblatt für Physiologie, Leipzig und Wien, 1899, Bd. 13, p. 54-58.)

Available in Library of the New York Academy of Medicine.

The addition of iodine to starch solution causes no marked variation in the freezing point, whereas addition of soluble starch to a strong iodine-KI solution, considerably lowers the freezing point.

Abstract in *Jour. chem. soc.*, 1899, v. 76, part 1, p. 851; *Chem. Centr.*, 1899, Bd. 1, p. 1161.

909. Norris, James F., and HENRY FAY. The reduction of selenium dioxide by sodium thiosulphate. (American chemical journal, Baltimore, 1900, v. 23, p. 119-125.)

PKA

Include an investigation on relation of acids and temperature to sensitivity of the starch-iodine reaction. Point out that temperature variations introduce an appreciable error in ordinary analytical work.

910. Andrews, Launcelot W., and HENRY M. GOETTSCH. Starch iodide. (American Chemical Society, Journal, Easton, 1902, v. 24, p. 865-881.)

PKA

Abstract in *Jour. chem. soc.*, 1903, v. 84, part 1, p. 10; *Chem. Zentr.*, 1902, Bd. 2, p. 1035.

911. Hale, F. E. Relation of hydriodic acid and of its salts to the starch and dextrin iodides. (American chemical journal, Baltimore, 1902, v. 28, p. 438-450.)

PKA

Confirms results of Mylius and Lonnes. Notes that blue starch iodide is converted into a red compound upon washing with KI solution. The behavior of the blue iodide of amidulin and the red iodide of erythrodextrin is somewhat similar.

Abstract in *Jour. chem. soc.*, 1903, v. 84, part 1, p. 151; *Chem. Centr.*, 1903, Bd. 1, p. 321.

912. — The initiative action of iodine and of other oxidizers in the hydrolysis of starch and dextrins. (American journal of science, New Haven, 1902, series 4, v. 13, p. 379-399.)

OA

Evidence that the loss of iodine, when starch is used as an indicator, is due to the impurities in starch, which are oxidized by the iodine. A carbohydrate intermediate between erythrodextrin and starch is termed amidulin.

Reprinted in *Zeitschrift für anorganische Chemie*, Leipzig, 1902, Bd. 31, p. 100-126.

Abstract in *Jour. chem. soc.*, 1902, v. 82, part 1, p. 533; *Jour. soc. chem. ind.*, 1902, v. 21, p. 1040; *Chem. Centr.*, 1902, Bd. 2, p. 26.

913. Pinnow, J. Über die Genauigkeit jodometrischer Bestimmungen. (Zeitschrift für analytische Chemie, Wiesbaden, 1902, Jahrg. 41, p. 485-488.)

PKA

The sensitiveness of the reaction is practically independent of the quantity of starch added and is not appreciably affected by the presence of non-electrolytes. The sensitivity is, however, markedly increased by electrolytes, Na₂SO₄ apparently being the most active.

Abstract in *Jour. chem. soc.*, 1903, v. 84, part 2, p. 39; *Bull. soc. chim. Paris*, 1903, série 3, tome 30, p. 282.

914. Biltz, Wilhelm. Ueber die blaue Adsorptionsverbindung von basischem Lanthanacetat und Jod. (Deutsche chemische

Starches and Dextrins, continued.

Reactions with Iodine, continued.

Gesellschaft, Berichte, Berlin, 1904, Jahrg. 37, p. 719-724.) **PKA**

An analogy is drawn between this adsorption compound and that of starch with I.

Abstract in *Jour. chem. soc.*, 1904, v. 86, part 2, p. 339.

915. Lottermoser, A. Über einige Adsorptionsverbindungen des colloidalen Silbers und anderer anorganischer Colloide mit organischen Colloiden. (*Journal für praktische Chemie*, Leipzig, 1905, N. F., Bd. 71, p. 296-304.) **PKA**

Starch and dextrin are used as stabilizing colloids. Gives evidence that starch-I is an absorption compound.

Abstract in *Jour. chem. soc.*, 1905, v. 88, part 2, p. 318; *Bull. soc. chim. Paris*, 1906, série 3, tome 36, p. 797.

916. Padoa, M., and B. SAVARÈ. Sulla natura del ioduro d'amido. (*Reale accademia dei Lincei, Atti*, Roma, 1905, serie 5, tomo 14, semestre 1, p. 467-476.) ***ER**

Show by conductivity measurements that starch iodide is an additive product of iodine, starch, and KI or HI. A constant relation between the iodine and HI was not found. The starch iodide contained about 19% iodine.

Reprint in *Gazzetta chimica italiana*, Roma, 1906, v. 36, parte 1, p. 313-324. **PKA**

Abstract in *Jour. chem. soc.*, 1905, v. 88, part 1, p. 416; *Chem. Centr.*, 1905, Bd. 1, p. 1593; *Bull. assoc. chimistes*, 1906-07, tome 24, p. 1241; *Bull. soc. chim. Paris*, 1906, série 3, tome 36, p. 760; *ibid.*, 1907, série 4, tome 2, p. 954.

917. Tanaka, Yoshio. On the starch of glutinous rice. (Tokio.—Imperial University: College of Engineering, Journal, 1906-09, v. 4, p. 15-29.) **VDA**

918. Tinkler, Charles K. Studies of the perhalogen salts. Part 1. (*Chemical Society of London, Journal*, 1907, v. 91, p. 996-1003.) **PKA**

A study of the absorption spectra indicates that the production of blue starch iodide is dependent on the presence of a periodide.

Abstract in *Chem. Centr.*, 1907, Bd. 2, p. 512.

919. Katayama, M. Über die Natur der Jodstärke. (*Zeitschrift für anorganische Chemie*, Leipzig, 1908, Jahrg. 56, p. 209-217.) **PKA**

The influence of the concentration of starch, iodine, and potassium iodide on the formation of the iodide has been investigated by bringing the components together in varying proportions and determining the

quantity of iodide of starch produced by means of colorimetric measurements.

Abstract in *Jour. chem. soc.*, 1908, v. 94, part 1, p. 9; *Chem. abst.*, 1908, v. 2, p. 749; *Jour. soc. chem. ind.*, 1907, v. 26, p. 1289; *Chem. Zentr.*, 1908, Bd. 1, p. 239; *Bull. soc. chim. Paris*, 1908, série 4, tome 4, p. 1206-1207.

920. Padoa, M. Osservazioni ad una nota "Sulla natura del ioduro d'amido." (*Reale accademia dei Lincei, Atti*, Roma, 1908, serie 5, v. 17, semestre 1, p. 214-215.) ***ER**

A critical discussion of the work of Katayama.

Abstract in *Chem. Centr.*, 1908, Bd. 1, p. 1457; *Bull. soc. chim. Paris*, 1910, série 4, tome 8, p. 89.

921. Castoro, N. Sulla colorazione delle particelle di amido colloidale e di amido perfettamente solubile con jodo-ioduro di potassio. (*Gazzetta chimica italiana*, Roma, 1909, v. 39, parte 1, p. 603-607.) **PKA**

Starch is separated by treatment with H_2SO_4 , by filtration and by dialysis into various solutions. The solutions differ in their exhibition of the Tyndall phenomenon and in the intensity of their iodine colorations.

Abstract in *Jour. soc. chem. ind.*, 1909, v. 28, p. 898; *Jour. chem. soc.*, 1909, v. 96, part 1, p. 634; *Chem. Zentr.*, 1909, Bd. 2, p. 974.

922. Gautier, Cl., and TH. NOGIER. Action des rayons ultra-violetes sur les produits colorés que donnent, avec le réactif iodo-ioduré, l'amidon et le glycogène. (*Société de biologie, Comptes rendus*, Paris, 1910, tome 69, p. 156-157.) **QAA**

The rays from a Hg lamp decolorized blue starch iodide.

Abstract in *Chem. abst.*, 1911, v. 5, p. 310.

923. Harrison, William. The starch-iodine reaction. (*Chemical Society of London, Proceedings*, 1910, v. 26, p. 252-253.) **PKA**

Evidence that the blue solution of iodine and starch is a colloidal solution of iodine, the starch acting as a protective colloid.

Reprint in *Jour. soc. chem. ind.*, 1910, v. 29, p. 1335.

Abstract in *Chem. abst.*, 1911, v. 5, p. 2769.

924. Rivat, Georges. Neue Untersuchungsmethode der durch Jod in Gegenwart von Dextrinen hervorgerufenen Färbungen. (*Chemiker-Zeitung*, Cöthen, 1910, Jahrg. 34, p. 1141.) **††VOA**

Iodine shows a greater affinity for dextrans than for starch; using very dilute solutions, the intensity of iodine coloration produced by soluble starch is an inverse measure of the amount of dextrans present.

Abstract in *Jour. soc. chem. ind.*, 1910, v. 29, p. 1323; *Chem. abst.*, 1911, v. 5, p. 257; *Jour. chem. soc.*, 1910, v. 98, part 2, p. 1117; *Chem. Zentr.*, 1910, Bd. 2, p. 1724; *Bull. assoc. chimistes*, 1910-11, tome 28, p. 428; *Bull. soc. chim. Paris*, 1911, série 4, tome 10, p. 620.

Starches and Dextrins, continued.

Reactions with Iodine, continued.

925. Harrison, William. Die Farbenreaktionen der Stärke und ihrer hydrolytischen Spaltungsprodukte mit Jod. (Kolloid-Zeitschrift, Dresden, 1911, Bd. 9, p. 5-9.) **PKA**

Determines color changes produced by variations in the temperature and in the amounts of I, KI and starch. Salts usually intensify the coloration. Colloidal AgCl may be formed in a starch solution. Ultramicroscopic observations show that the hydrolysis of starch by acids or enzymes is accompanied by an increase in the degree of dispersion.

Abstract in *Chem. abst.*, 1912, v. 6, p. 18; *Chem. Zentr.*, 1911, Bd. 2, p. 1434; *Bull. assoc. chimistes*, 1911-12, tome 29, p. 463-464.

926. Barger, George, and ELLEN FIELD. Blue adsorption compounds of iodine. 1. Starch, saponarin and cholalic acid. (Chemical Society of London, Journal, 1912, v. 101, p. 1394-1408.) **PKA**

Investigates behavior of starch iodide toward electrolytes and dyes.

Abstract in *Chem. abst.*, 1913, v. 7, p. 330; *Chem. Zentr.*, 1912, Bd. 2, p. 1520; *Bull. soc. chim. France*, 1913, série 4, tome 14, p. 3.

927. Tanaka, Yoshio. On the starch of glutinous rice and its hydrolysis by diastase. (Journal of industrial and engineering chemistry, Easton, 1912, v. 4, p. 578-581.)

VOA

This variety of starch gives a pure red coloration with iodine, although it contains no albumenoids, amylo-, erythro- or achroo-dextrin; its microscopic appearance does not differ from that of common rice starch and its hydrolysis by amylase is similar to that of ordinary starch except that the ratio of dextrin to maltose is higher.

Abstract in *Jour. soc. chem. ind.*, 1912, v. 31, p. 832; *Jour. chem. soc.*, 1913, v. 104, part 1, p. 446; *Chem. abst.*, 1912, v. 6, p. 3035; *Chem. Zentr.*, 1913, Bd. 1, p. 309.

928. Burgstaller. Über Jodstärke. (Auszug.) (Chemiker-Zeitung, Cöthen, 1913, Jahrg. 36, p. 589.) **†† VOA**

Studies transitions of the blue to red-violet to brown starch iodide.

Abstract in *Chem. abst.*, 1913, v. 7, p. 1833.

929. Boa, Peter. Note on pasta iodi et amyli, British Pharmacopoeia Cod. (Pharmaceutical journal and pharmacist, London, 1915, v. 94, p. 485-486.) **WTA**

In Martindale's original formula, and in Brit. Pharm. Cod. 1907, starch 1, glycerol 2 and H₂O 6 parts were boiled together; when cold, I solution was added. The result was a firm, blue paste. In Brit. Pharm. Cod. 1911, only water-bath heat is used; an unsatisfactory semi-liquid mass of dead black color results. — *Chem. abst.*

930. Clementi, A. L'influenza disturbatrice di alcune sostanze d'importanza fisiologia sulla reazione colorata tra iodio e amido. (Archivio di farmacologia sperimentale e scienze affine, Siena, 1915, v. 20, p. 258-268.)

Available in Library of Surgeon General's Office.

The blue iodine-starch coloration is destroyed by furfural, the velocity of decolorization being directly proportional to the amount of furfural and inversely proportional to that of iodine. Certain widely different types of proteins also effect decolorization; epinephrine changes the color from red to rose.

Abstract in *Jour. chem. soc.*, 1916, v. 110, part 2, p. 400; *Chem. Zentr.*, 1916, Bd. 1, p. 179.

931. Vanino, L., and A. SCHINNER. Über das Verhalten der Jodstärke gegen die Pukall'sche Tonzelle und Vanino's Reagens. (Archiv der Pharmazie, Berlin, 1915, Bd. 253, p. 47-51.)

Available in Library of Columbia College of Pharmacy.

Starch solutions penetrate the Pukall cell, whereas the starch iodides do not. The iodides are precipitated by Vanino's reagent, whereas the starch solutions are precipitated only with difficulty.

Abstract in *Chem. abst.*, 1915, v. 9, p. 2125; *Chem. Zentr.*, 1915, Bd. 1, p. 528; *Bull. soc. chim. Paris*, 1917, série 4, tome 22, p. 433.

932-933. Bordier, H. Action de la lumière sur l'iode et l'iodure d'amidon en milieu aqueux. (Académie des sciences, Comptes rendus, Paris, 1916, tome 163, p. 205-206.)

***EO**

When aqueous solutions of starch iodide are exposed to light for some hours the blue color disappears and the liquid becomes acid. The blue color is restored by addition of a trace of iodine.

Abstract in *Jour. soc. chem. ind.*, 1916, v. 35, p. 962; *Chem. Zentr.*, 1916, Bd. 2, p. 872.

934. — Action des rayons X sur l'iode et l'iodure d'amidon en milieu aqueux. (Académie des sciences, Comptes rendus, Paris, 1916, tome 163, p. 291-293.) ***EO**

The above effect is produced by X-rays in a few minutes.

Abstract in *Chem. abst.*, 1916, v. 10, p. 3016; *Chem. Zentr.*, 1917, Bd. 1, p. 5.

935. Lorenz, A. W. Sensitiveness of the iodo-starch reaction. (Chemist-analyst, Philipsburg, N. J., Oct., 1916, no. 19, p. 20-21.) **3-VOL**

Discusses influence of KI.

Abstract in *Chem. abst.*, 1917, v. 11, p. 1936.

936. Berczeller, L. Untersuchungen über Adsorptionsverbindungen und Adsorption. 1. Über Jodstärke. (Biochemische Zeit-

Starches and Dextrins, continued.

Reactions with Iodine, continued.

schrift, Berlin, 1917, Bd. 84, p. 106-117.)

PPB

The presence of KI is not necessary for formation of the complex. Starch takes up more I at lower than at higher temperatures, and the adsorption equilibrium is attained more rapidly in dilute than in concentrated solutions.

Abstract in *Chem. abst.*, 1918, v. 12, p. 1264; *Chem. Centr.*, 1918, Bd. 1, p. 335; *Bull. soc. chim. France*, 1920, série 4, tome 28, p. 36.

937. **Lumière, Auguste.** Sur l'emploi de l'iodure d'amidon dans le traitement des plaies infectées. (Académie des sciences, Comptes rendus, Paris, 1917, tome 165, p. 376-377.)

*EO

A solution of starch iodide has an antiseptic strength similar to that of Dakin, is not irritating to the tissues, does not harm clothing and retains its activity over considerable periods of time.

Abstract in *Jour. soc. chem. ind.*, 1917, v. 36, p. 1061; *Chem. abst.*, 1918, v. 12, p. 189; *Chem. Zentr.*, 1918, Bd. 1, p. 39.

938. **Berczeller, L.** Über Kolloidmembranen als Dialysatoren. (Biochemische Zeitschrift, Berlin, 1918, Bd. 90, p. 302-304.)

PPB

In dialyzing a starch solution against a solution of I in KI, it was found that I was taken up by the membrane.—*Chem. abst.*

939. **Brooks, H. E.** Starch indicator solution. (Chemist analyst, Philipsburg, N. J., Oct., 1918, no. 27, p. 9.)

Available in Library of Chemists' Club.

Describes the use of an alkaline solution of soluble starch.

Abstract in *Chem. abst.*, 1919, v. 13, p. 1290.

940. **Kolthoff, J. M.** Jodometrische Studien. (Auszug.) (Chemisches Zentralblatt, Berlin, 1919, Bd. 2, p. 717.)

PKA

Finds the sensitivity of the starch-iodine reaction is decreased by thiocyanates, by organic substances and by temperature increases. The sensitivity is increased by the presence of acids and salts, being a maximum in KI solution.

Also abstracted in *Chem. abst.*, 1919, v. 13, p. 1434; *Jour. chem. soc.*, 1919, v. 116, part 2, p. 239.

941. **Epstein, Albert A.** An iodine preparation for intravenous and intraspinal use. (Abstract.) (Science, New York, 1920, v. 51, p. 21.)

OA

By means of heat and pressure iodine is dissolved in dextrin solution, the resulting solution being strongly bactericidal.

942. **Chretien, E., and H. VANDENBERGHE.** Sur le dosage de l'hydrogène sulfuré dans les eaux sulfurées calciques; sensibilité de la réaction de l'empois d'amidon avec l'iode. (Annales de chimie analytique, Paris, 1921, année 26, p. 19-23.)

PKA

Work includes determinations of minimal amounts of I required to produce the characteristic coloration.

Abstract in *Chem. abst.*, 1921, v. 15, p. 1365; *Bull. soc. chim. France*, 1921, série 4, tome 30, p. 522.

943. **Euler, Hans von, and KARL MYRBÄCK.** Über die Aufnahme von Jod durch Stärke. (Arkiv för kemi, mineralogi och geologi, Stockholm, 1921, bd. 8, no. 9, 29 p.)

PWA

By titrating with thiosulphate solution, determine partition of I between starch solutions and benzol; investigate several starches previously subjected to various treatments. Results indicate the stepwise formation of two definite compounds. Also investigate the behavior of starch iodide toward alkali and KI and relation between blue coloration and concentration of starch. In a supplement describe experiments on the hydrolysis of starch by dilute HCl with and without the presence of neutral salts and also hydrolysis of starch by malt amylase.

Abstract in *Chem. Zentr.*, 1922, Bd. 3, p. 489; *Chem. abst.*, 1921, v. 15, p. 2364.

944. **Kolthoff, J. M.** Die Jodamylumreaktion. (Zeitschrift für analytische Chemie, München-Wiesbaden, 1921, Bd. 60, p. 338-341.)

PKA

A starch solution preserved with mercuric iodide was not altered after 3 years. Weakly alkaline salts hardly affect the sensitiveness of the reaction whereas alcohols and albuminoids exert an unfavorable influence.

Abstract in *Bull. soc. chim. France*, 1922, série 4, tome 32, p. 386.

945. **Lottermoser, A.** Die Konstitution der Jodstärke. (Zeitschrift für angewandte Chemie, Leipzig, 1921, Jahrg. 34, p. 427-428.)

PKA

The combination of iodine and starch is shown to follow a typical adsorption curve. Measurements are based on (1) determinations of electrical potential in the system free iodine-iodide ion, as formulated in the Nernst equation, and (2) determinations of the distribution ratio of free iodine between 0.1N KI solution and carbon tetrachloride. Although the iodine ion is not appreciably adsorbed by starch, believes that it is necessary for production of the blue iodide.

A more detailed account in *Zeitschrift für Elektrochemie und angewandte physikalische Chemie*, Halle, 1921, Jahrg. 27, p. 496-501, PKA.

Abstract in *Chem. abst.*, 1922, v. 16, p. 10; *Chem. Zentr.*, 1921, Bd. 3, p. 945; 1922, Bd. 1, p. 738.

Starches and Dextrins, continued.

Reactions with Iodine, continued.

946. Berczeller, L. Über Jodstärke. (Biochemische Zeitschrift, Berlin, 1922, Bd. 133, p. 502-508.) **PPB**

Further evidence that starch iodide is an adsorption compound. Finds I is not adsorbed by starch from CCl_4 or C_6H_6 solutions and in alcohol solution adsorption is less than from water. Adsorption by cellulose and dextrin is less than by starch. Adsorption by dissolved starch is measured by partition coefficients and by dialysis, results showing that less I is adsorbed than by solid starch.

Abstract in *Chem. Zentr.*, 1923, Bd. 3, p. 298; *Chem. abst.*, 1923, v. 17, p. 1179.

947. Euler, Hans von, and STIG BERGMAN. Ueber die Bindung des Jods an Stärke. 1. (Kolloid-Zeitschrift, Dresden and Leipzig, 1922, Bd. 31, p. 81-89.) **PKA**

Have determined partitions of I between benzene and water, KI solutions and starch solutions at various temperatures. With Zulkowski's soluble starch the amount of I adsorbed is proportional to the concentration of I. Acidities below pH 2.5 have little effect. Upon determining absorption spectra of the solutions find KI increases the absorption in the blue.

Abstract in *Chem. abst.*, 1922, v. 16, p. 4110; *Chem. Zentr.*, 1923, Bd. 1, p. 1616; *Bull. soc. chim. France*, 1923, série 4, tome 34, p. 814.

948. Euler, Hans von, and STURE LANDER-GREN. Ueber die Bindung des Jods an Stärke. 2. (Kolloid-Zeitschrift, Dresden and Leipzig, 1922, Bd. 31, p. 89-90.) **PKA**

Determinations of I partition between toluene and starch solutions containing constant amounts of KI, show that absorption of I is not proportional to the concentration of starch.

Abstract in *Chem. abst.*, 1922, v. 16, p. 4111.

949. Euler, Hans von, and KARL MYRBÄCK. Verbindungen von Jod mit Bestandteilen der Stärke. (Liebig's Annalen der Chemie, Leipzig, 1922, Bd. 428, p. 1-24.) **PKA**

Practically same as entry 943; the experiments on starch hydrolysis are omitted, while observations on P content of starches are added.

Abstract in *Chem. abst.*, 1922, v. 16, p. 2427; *Jour. chem. soc.*, 1922, v. 122, part 1, p. 527.

950. Firth, James B., and F. S. WATSON. Distribution of iodine between chloroform and starch solution with and without the addition of potassium iodide. (Society of Chemical Industry, Journal, London, 1923, v. 42, p. 308-310T.) **VOA**

Determine effect of varying the concentration of the starch solution, effect of addi-

tion of KI to the starch solution, and effect of varying the proportion of KI.

Abstract in *Chem. abst.*, 1923, v. 17, p. 3148; *Chem. Zentr.*, 1924, Bd. 1, p. 689; *Chimie et industrie*, 1924, v. 11, p. 671.

951. Hallgren, W. Starch iodide. (Abstract.) (Chemical abstracts, Easton, 1923, v. 17, p. 3425.) **PKA**

By shaking dried starch with an ether solution of I and evaporating the ether, a grayish yellow compound was obtained which contained 4.9% I and, after preserving for 14 months, contained 4.3% I. The I content of the usual blue starch-I decreased from 5% to 2.8% in 8 days.

952. Lottermoser, A. Untersuchungen über die Aufnahme von Jod durch verschiedene Substanzen. (Kolloid-Zeitschrift, Dresden and Leipzig, 1923, Bd. 33, p. 271-274.) **PKA**

A lecture describing the types of curves obtained when I is taken up by various substances, as in the systems CCl_4 -O.IN KI-soluble starch; C_6H_6 -H₂O-soluble starch; basic La acetate; lecithin-albumin; dry $\text{Ca}(\text{OH})_2$; dry CaO; and cholic acid. No numerical data or curves are given.—*Chem. abst.*

Abstract in *Jour. chem. soc.*, 1924, v. 126, part 2, p. 93; *Chem. Zentr.*, 1924, Bd. 1, p. 406.

953. Barger, George, and F. J. EATON. Blue adsorption compounds of iodine. 4. (Chemical Society of London, Journal, 1924, v. 125, p. 2407-2414.) **PKA**

Abstract in *Chem. abst.*, 1925, v. 19, p. 619.

954. Berczeller, L., and H. WASTL. Über Farbe und Dispersitätsgrad. 2. (Biochemische Zeitschrift, Berlin, 1924, Bd. 144, p. 170-174.) **PPB**

Include theoretical remarks on the mechanism of the starch-halogen reactions.

Abstract in *Chem. Zentr.*, 1924, Bd. 1, p. 1641.

955. Bergmann, Max. Jodverbindungen einfacher 1,2-Cyclo-acetale vom Typus der Jodstärke. (Deutsche chemische Gesellschaft, Berichte, Berlin, 1924, Jahrg. 57, p. 753-755.) **PKA**

The methylcycloacetals of acetol and acetoin take up I and KI forming unstable bluish-black crystalline compounds. The formation of starch-I is attributed to the presence of similar oxygen rings in starch.

Abstract in *Chem. abst.*, 1924, v. 18, p. 2874; *Chem. Zentr.*, 1924, Bd. 2, p. 24.

956. Bergmann, Max, and STEPHAN LUDEWIG. Über die Halogenverbindungen der Stärke. (Deutsche chemische Gesellschaft, Berichte, Berlin, 1924, Jahrg. 57, p. 961-963.) **PKA**

By treating rice starch with acetic anhydride saturated with HCl, obtain a product

Starches and Dextrins, continued.

Reactions with Iodine, continued.

containing 45-48% acetyl, which is soluble in CHCl_3 and from which soluble starch may be partially regenerated. Find the ester retains the typical power of starch for combining with I-KI and with Br. Observations are regarded as evidence that certain bridge oxygens are responsible for the adsorption of halogen.

Abstract in *Chem. abst.*, 1924, v. 18, p. 3046; *Jour. chem. soc.*, 1924, v. 126, part 1, p. 837.

957. Dhar, N. R. The starch-iodine reaction. (*Journal of physical chemistry*, Ithaca, 1924, v. 28, p. 125-130.) **PKA**

Finds that when alcoholic I is added to a starch solution the conductivity of the mixture is greater than the sum of the conductivities of the separate constituents. Suggests the formation of a colloidal adsorption compound which conducts by means of micellar ions.

Abstract in *Chem. abst.*, 1924, v. 18, p. 1413; *Chem. Zentr.*, 1924, Bd. 1, p. 1490.

958. Lottermoser, A. Untersuchungen über die Jodstärke. (*Zeitschrift für angewandte Chemie*, Leipzig und Berlin, 1924, Jahrg. 37, p. 84-85.) **PKA**

An address in which experiments on adsorption of tri-iodine, iodine, and iodine by starch are described. The curves obtained are typical adsorption isotherms. In the reaction between starch and I in the presence of KI there is probably an initial adsorption followed by a further slow combination.

Abstract in *Jour. soc. chem. ind.*, 1924, v. 43, p. 271B; *Chem. Zentr.*, 1924, Bd. 1, p. 1491.

959. Roncato, A. Le spectre d'absorption dans l'ultra-violet comme indice discriminatif entre les procédés d'adsorption et les procédés chimiques. (*Archives italiennes de*

biologie, Pisa, 1924, tome 74, p. 146-149.) **QAA**

Notes that starch-iodide shows the same ultra-violet spectrum as starch itself, indicating that there has been no chemical change involved in the formation of the starch-iodide.

960. Sen, K. C. Starch-iodine reaction. (Abstract.) (*Society of Dyers and Colourists*, Journal, Bradford, 1924, v. 40, p. 384.) **VLA**

Abstract in *Chem. news*, 1924, v. 129, p. 194-196; *Chem. Zentr.*, 1924, Bd. 2, p. 2322.

960A. Angelescu, E., and J. MIRESCU. Adsorption of iodine by starch. Abstract. (*Chemical abstracts*, Easton, 1926, v. 20, p. 686.) **PKA**

Derive an exponential formula for the adsorption of iodine by maize starch.

961. Ghosh, S., and N. R. DHAR. Studien über Adsorption, 9. Der Einfluss verschiedener Substanzen und die Bedeutung der Adsorption von Anionen für die Koagulation von Arsen- und Antimontrisulfidsolen. (*Kolloid-Zeitschrift*, Dresden and Leipzig, 1925, Bd. 36, p. 129-137.) **PKA**

Note that dilution of negative iodine-starch-sol in the presence of univalent, bivalent and tervalent cations renders it more stable. The addition of an iodide renders it less stable.

962. Murray, H. D. The composition of starch iodide. (*Chemical Society of London*, Journal, 1925, v. 127, p. 1288-1294.) **PKA**

Abstract in *Chem. abst.*, 1925, v. 19, p. 2643; *Chem. Zentr.*, 1925, Bd. 2, p. 1264.

962A. Rousseau, E. Sur le virage de l'empois d'amidon ioduré soumis à l'action des rayons ultra-violet. (*Société de biologie*, Comptes rendus, Paris, 1925, tome 93, p. 1482-1483.) **QAA**

REACTIONS WITH FORMALDEHYDE

963. Classen, A. Amyloform. (*Pharmaceutische Zeitung*, Berlin, 1896, Jahrg. 41, p. 615.)

Available in Library of Columbia College of Pharmacy.

Describes the white powder formed by the action of formaldehyde on starch in regard to its properties as a surgical dressing.

Abstract in *Jour. soc. chem. ind.*, 1896, v. 15, p. 738.

964. Schleich, C. L. Zur Glutolbehandlung. (*Therapeutische Monatshefte*, Berlin, 1896, Jahrg. 10, p. 608.)

Available in Library of the New York Academy of Medicine.

965. Classen, A. Zur Kenntnis des Amyloforms und des Glutols. (*Therapeutische Monatshefte*, Berlin, 1897, Jahrg. 11, p. 33-34.)

Available in Library of the New York Academy of Medicine.

Starch and dextrin, when treated with formaldehyde, yield chemical compounds of constant composition, which are comparatively stable to heat, do not gelatinize, do not possess the microscopic structure of starch and yield free aldehyde upon treatment with dilute acids or alkali. The blue compound of starch with iodine and formaldehyde is termed amylo-iodoform.

Abstract in *Chem. Centr.*, 1897, Bd. 1, p. 395.

Starches and Dextrins, continued.

Reactions with Formaldehyde, continued.

966. — Zur Kenntniss des Amyloforms und Glutols. Den Herren Gottstein und Schleich in Berlin zur Erwidern. (Münchener medicinische Wochenschrift, München, 1897, Jahrg. 44, p. 307-308.)

Available in Library of the New York Academy of Medicine.

Abstract in *Chem. Centr.*, 1897, Bd. 1, p. 939.

967. Gottstein, A. Über eine Reaktion des Glutols. (Therapeutische Monatshefte, Berlin, 1897, Jahrg. 11, p. 95-96.)

Available in Library of the New York Academy of Medicine.

Referring to article of Classen (*entry 965*), author states that he had previously prepared amyloform and studied its antiseptic properties.

Abstract in *Chem. Centr.*, 1897, Bd. 1, p. 715.

968. Longard, C. Zur Amyloformfrage. (Therapeutische Monatshefte, Berlin, 1897, Jahrg. 11, p. 34-35.)

Available in Library of the New York Academy of Medicine.

Believes amyloform is a mechanical mixture of starch and formaldehyde.

Abstract in *Chem. Centr.*, 1897, Bd. 1, p. 396.

969. Schleich, C. L. Zur Glutol-Frage. (Therapeutische Monatshefte, Berlin, 1897, Jahrg. 11, p. 97.)

Available in Library of the New York Academy of Medicine.

Referring to article of Classen (*entry 965*), claims priority as to the use of amyloform for medical purposes.

970. Syniewski, Wiktor. Ueber die Einwirkung von Formaldehyd auf Stärke und über eine Jodverbindung des Amylodextrins. (Liebig's Annalen der Chemie, Leipzig, 1902, Bd. 324, p. 201-212.) **PKA**

Potato starch, after treatment with 40% formaldehyde solution for two months, acquires the consistence of an ordinary starch solution of similar concentration but does not give the iodine reaction. The compound is readily decomposed on heating, slowly hydrolyzed by water and rapidly by acids, the hydrolytic product resembling amyloform. Amylodextrin dissolves readily in concentrated formaldehyde solution; the solution gives no reaction with iodine and on evaporation a crystalline residue remains, which gives no iodine reaction. The iodide of amyloform was found to contain about 20% iodine.

Abstract in *Jour. soc. chem. ind.*, 1902, v. 21, p. 1341; *Jour. chem. soc.*, 1903, v. 84, part 1, p. 68; *Chem. Centr.*, 1902, Bd. 2, p. 986.

971. Reichard, Albert. Die Einwirkung von Formaldehyd auf Stärke. (Zeitschrift für das gesammte Brauwesen, München, 1908, Jahrg. 31, p. 161-163.) **† VTRA**

Upon treating starch with formaldehyde, the temperature of gelatinization was found to decrease with an increase in the concentration of formaldehyde and the duration of its action. Gives evidence of the formation of a compound of formaldehyde and amyloform.

Abstract in *Jour. soc. chem. ind.*, 1908, v. 27, p. 461; *Chem. abst.*, 1908, v. 2, p. 1851, 2881; *Jour. chem. soc.*, 1908, v. 94, part 1, p. 606; *Chem. Centr.*, 1908, Bd. 1, p. 1834; *Bull. assoc. chimistes*, 1908-09, tome 26, p. 113-114.

972. Woker, Gertrud. Der Formaldehyd als Diastasemodell. Ein Beitrag zur Theorie der Diastasewirkung. (Deutsche chemische Gesellschaft, Berichte, Berlin, 1916, Jahrg. 49, p. 2311-2318.) **PKA**

From hypothetical structural relationships of amylase and formaldehyde, predicts that the latter will hydrolyze starch. Finds the action of relatively large quantities of formaldehyde destroys the blue iodine reaction and an osazone was isolated from the reaction products. Notes that formaldehyde effects a preliminary increase in viscosity of starch.

Abstract in *Chem. abst.*, 1917, v. 11, p. 2090; *Jour. soc. chem. ind.*, 1916, v. 35, p. 1268.

973. Kaufmann, Wilhelm von. Notiz über die reduzierenden Eigenschaften der Stärke. (Biochemische Zeitschrift, Berlin, 1917, Bd. 78, p. 371-374.) **PPB**

Soluble starch is shown to possess a slight reducing power, to give a yellow coloration on warming with alkalis and to react with phenylhydrazine yielding a yellowish brown precipitate. These observations are taken as evidence against the starch hydrolyzing action of formaldehyde as reported by Woker (*entry 972*).

Abstract in *Chem. Centr.*, 1917, Bd. 1, p. 493.

974. — Über die Reaktion der Stärke mit Formaldehyd und über die angeblichen diastatischen Eigenschaften des Formaldehyds. (Deutsche chemische Gesellschaft, Berichte, Berlin, 1917, Jahrg. 50, p. 198-202.) **PKA**

Criticizing the conclusions of Woker, states that the compound which is formed by starch and HCHO completely masks the I reaction. Removal of HCHO regenerates the starch practically unchanged.

Abstract in *Chem. abst.*, 1917, v. 11, p. 2792; *Jour. chem. soc.*, 1917, v. 112, part 1, p. 251; *Chem. Centr.*, 1917, Bd. 1, p. 310.

975. Maggi, Harry, and GERTRUD WOKER. Osazone aus Formaldehyd-Stärke Gemischen. (Deutsche chemische Gesellschaft,

Starches and Dextrins, continued.

Reactions with Formaldehyde, continued.

Berichte, Berlin, 1917, Jahrg. 51, p. 1188-1189.) **PKA**

An osazone, m. p. 181-182°, separating in yellow rosetts has been obtained from the dialyzate of a mixture of HCHO and starch kept at 40-50° for 30 minutes. The sugar may possibly be a mixture of maltose and isomaltose. It is fermentable by yeast.—*Chem. abst.*

Abstract in *Bull. soc. chim. France*, 1918, série 4, tome 23, p. 357.

976. Woker, Gertrud. Über die Reaktion der Stärke mit Formaldehyd und über die diastatischen Eigenschaften des Formaldehyds. (Deutsche chemische Gesellschaft, Berichte, Berlin, 1917, Jahrg. 50, p. 679-692.) **PKA**

A reply to Kaufmann (entry 974), in which the action of HCHO is shown to resemble that of amylase in a number of ways.

Abstract in *Chem. abst.*, 1917, v. 11, p. 3259.

977. Maggi, Harry. Zur Frage des Zusammenhangs von Diastase, Peroxydase und Katalase. (*Helvetica chimica acta*, Basileae et Genevae, 1918, v. 1, p. 433-451.) **PKA**

Discusses theoretical function of an aldehyde group in these enzymes. Investigates action of mixtures of starch and formaldehyde by the capillarity method; the presence of dextrins is detected by means of iodine and of sugars by Fehling's solution. The behavior of formaldehyde towards starch resembles that of amylase.

Abstract in *Chem. abst.*, 1919, v. 13, p. 326; *Jour. chem. soc.*, 1919, v. 116, part 1, p. 49; *Chem. Zentr.*, 1919, Bd. 1, p. 553; *Chimie et industrie*, 1919, v. 2, p. 668.

978. Maggi, Harry, and GERTRUD WOKER. Zur Frage des Stärkeabbaus durch Formaldehyd. (Deutsche chemische Gesellschaft, Berichte, Berlin, 1918, Jahrg. 51, p. 790-793.) **PKA**

The dialyzable product formed in the starch-formaldehyde mixture is shown to yield glucose by the action of moulds. This observation is regarded as confirming their earlier view that the product is a dextrin.

Abstract in *Chem. abst.*, 1919, v. 13, p. 579; *Bull. soc. chim. France*, 1919, série 4, tome 25, p. 192.

979. Jacoby, Martin. Über den vermeintlichen Abbau der Stärke durch Formaldehyd. (Deutsche chemische Gesellschaft, Berichte, Berlin, 1919, Jahrg. 52, p. 558-562.) **PKA**

Starch, when treated with formaldehyde, loses its power of giving a blue color with iodine. Author finds that ammonium acetate restores this blue color, whereas the color is not restored if the starch has been acted upon by diastase. Also finds, by pre-

cipitation with alcohol, that the starch is recovered unchanged when the formaldehyde is removed by ammonium acetate.

Abstract in *Chem. abst.*, 1919, v. 13, p. 2528.

980. Kaufmann, William von, and A. LEWITE. Über die Natur der Lösungen von Stärke in Formalin und die quantitative Rückverwandlung von Formalin Stärke in Stärke, zugleich ein Beitrag zur Kenntnis des Farbentons von Jodlösungen. (Deutsche chemische Gesellschaft, Berichte, Berlin, 1919, Jahrg. 52, p. 616-628.) **PKA**

By precipitation with alcohol, starch can be recovered unchanged from solutions in formalin, although the solution gives no reaction with iodine. It is shown that formaldehyde produces a reversible physical change in the state of aggregation of the starch.

Abstract in *Chem. abst.*, 1919, v. 13, p. 2528; *Jour. chem. soc.*, 1919, v. 116, part 1, p. 312; *Bull. soc. chim. France*, 1919, série 4, tome 26, p. 399; *Chem. Zentr.*, 1919, Bd. 1, p. 609.

981. Maggi, Harry. Zur Frage der Diastasemodelleigenschaften des Formaldehyds. Versuche über die Einwirkung von Formaldehyd auf Stärke. (Fermentforschung, Leipzig, 1919, Bd. 2, p. 304-448.) **PPH**

The liquefaction of starch by HCHO is investigated by capillary methods, the dextrinization by the iodine reaction and the saccharification by the Moore-Heller, and the Rubner tests and by reduction, osazone and fermentation tests. Illustrations are given showing the I coloration of HCHO treated starch grains and comparative actions of H₂O, amylase and HCHO on various starch grains. Viscosimetric and polarimetric variations in the starch-HCHO mixtures are determined and the course of resynthesis is also followed. Most of this work has been previously reported.

Abstract in *Chem. abst.*, 1920, v. 14, p. 1345; *Chem. Zentr.*, 1919, Bd. 3, p. 635.

982. Sallinger, Hermann. Über die angeblichen diastatischen Eigenschaften des Formaldehyds. (Deutsche chemische Gesellschaft, Berichte, Berlin, 1919, Jahrg. 52, p. 651-656.) **PKA**

A solution of amylopectin is found to retain its optical activity unchanged after 44 hours digestion with formaldehyde. A solution of soluble starch, after treatment with formaldehyde and removal of the latter, only showed slight reducing power towards Fehling's solution. Starch solutions treated with formaldehyde showed no greater reducing power than pure water mixed with the same amount of formaldehyde.

Abstract in *Chem. abst.*, 1919, v. 13, p. 2529; *Jour. chem. soc.*, 1919, v. 116, part 1, p. 253; *Chem. Zentr.*, 1919, Bd. 1, p. 715.

Starches and Dextrins, continued.

Reactions with Formaldehyde, continued.

983. Wohlgemuth, J. Über neue Theorien der Diastasebildung und Diastasewirkung. (Biochemische Zeitschrift, Berlin, 1919, Bd. 94, p. 213-224.) **PPB**

Fails to confirm work of Biedermann, who found a diastatic action in saliva ash. Contrary to Woker (*entry 972*), who claimed that formaldehyde exerts a diastatic action, author finds that starch treated with formaldehyde can be recovered unchanged if the aldehyde is removed with phenylhydrazine and alcohol.

Abstract in *Jour. chem. soc.*, 1919, v. 116, part 1, p. 361; *Chem. Zentr.*, 1919, Bd. 3, p. 280; *Chimie et Industrie*, 1919, v. 2, p. 1188.

984. — Über den vermeintlichen Abbau der Stärke durch Formaldehyd. Schlusswort an Frl. G. Woker. (Biochemische Zeitschrift, Berlin, 1919, Bd. 99, p. 316-319.) **PPB**

The experiments of Jacoby, Kaufmann, Lewite, Sallinger and others are cited against the contentions of Woker.

985. Woker, Gertrud. Zur Theorie der Diastasewirkung. (Biochemische Zeitschrift, Berlin, 1919, Bd. 99, p. 307-315.) **PPB**

A defense of author's previous observations as to the starch hydrolyzing action of HCHO. The negative results of Wohlgemuth are attributed to a starch dextrin reversion.

986. Woker, Gertrud, and HARRY MAGGI. Zur Frage der Diastasemodell-Eigenschaften des Formaldehyds. (Deutsche chemische Gesellschaft, Berichte, Berlin, 1919, Jahrg. 52, p. 1594-1604.) **PKA**

Defending their claims as to the amyolytic activity of formaldehyde, advance the theory that the starch degradation products

are resynthesized under the conditions used by their opponents. The digestion of egg albumin by papain is cited as an analogous phenomenon.

Abstract in *Chem. abst.*, 1920, v. 14, p. 1342; *Chem. Zentr.*, 1919, Bd. 3, p. 780.

987. Jacoby, Martin, and others. Über die angebliche Spaltung der Stärke durch Formaldehyd. Von M. Jacoby, W. v. Kaufmann, A. Lewite und H. Sallinger. (Deutsche chemische Gesellschaft, Berichte, Berlin, 1920, Jahrg. 53, p. 681-685.) **PKA**

A reply to Woker and Maggi (*entry 986*). The latter have stated that long standing of formaldehyde-starch mixtures has the effect of "masking" the reducing power of the sugars formed; Sallinger has accordingly carried out experiments with formaldehyde-maltose mixtures at 37° in which no such action was observed.

Abstract in *Jour. chem. soc.*, 1920, v. 118, part 1, p. 423; *Chem. Zentr.*, 1920, Bd. 1, p. 773.

988. Samec, Max, and ANKA MAYER. Studien über Pflanzenkolloide, 10. Über die Einwirkung von Formaldehyd auf Stärke. (Kolloidchemische Beihefte, Dresden und Leipzig, 1921, Bd. 13, p. 165-192.) **PKA**

Study action of formaldehyde solutions on potato starch at various temperatures. Find a highly hydrated, loose addition compound is formed, which does not give the iodine coloration and has about the same molecular weight, same dialyzable fraction, slightly higher specific gravity, considerably higher viscosity, and a slightly lower optical rotation than that of starch itself. Formaldehyde is not capable of effecting the degradation of starch nor of resynthesizing its degradation products. No discrimination is observed in the action of formaldehyde on amylose or on amylopectin.

Abstract in *Jour. chem. soc.*, 1921, v. 120, part 1, p. 400; *Chem. abst.*, 1921, v. 15, p. 773.

REACTIONS WITH BASES

989. Berzelius, Jacob. Experiments to determine the definite proportions in which the elements of organic nature are combined. (Annals of philosophy, London, 1815, v. 5, p. 260-275.) **OA**

p. 272. A potato starch solution was treated with an excess of lead subnitrate and the precipitate found to contain 39% lead oxide. Carried out combustion analyses on starch and on the lead amylate.

Reprinted in *Annales de chimie*, Paris, 1815, tome 5, p. 51-96, *PAA*.

990. Gay-Lussac. Action de la potasse sur les matières organiques. (Annales de chimie

et de physique, Paris, 1829, série 2, tome 41, p. 398-402.) **PAA**

Notes that treatment with two successive portions of KOH converts starch into oxalic acid.

Reprinted in *Annalen der Physik und Chemie*, Poggendorff's, 1829, Bd. 17, p. 171-175, *PAA*.

991. Payen, A. Action de la potasse, de la soude et de l'ammoniaque sur l'amidon. (L'Institut, Paris, 1836, année 4, p. 216.)

Available in Library of the Engineering Societies.

992. — Recherches sur les combinaisons définies de la dextre et sur son poids

Starches and Dextrins, continued.

Reactions with Bases, continued.

atomique. (Académie des sciences, Comptes rendus, Paris, 1837, tome 5, p. 115-116.)

*EO

The atomic weight is calculated from analyses of the lead and barium compounds.

Reprinted in further detail in *Annales de chimie et de physique*, 1837, série 2, tome 65, p. 225-257, *PKA*, which is condensed in *Annalen der Pharmacie*, Liebig's, 1838, Bd. 28, p. 271-277, *PKA*.

993. Thénard, and others. Rapport sur un mémoire de M. Payen, relatif à l'analyse élémentaire de l'amidon et à celle de la dextrine. Par Thénard, Dulong, and Dumas. (Académie des sciences, Comptes rendus, Paris, 1837, tome 5, p. 898-905.)

*EO

From a study of the lead compound of dextrin it is concluded that starch and dextrin are isomeric bodies which differ in physical properties.

994. Berzelius, Jacob. Extrait d'une lettre de M. Berzélius à M. Pelouze. (Académie des sciences, Comptes rendus, Paris, 1839, tome 8, p. 352-356.)

*EO

Includes critical discussion of Payen's lead amylate.

Reply by Payen, *ibid.*, p. 533-544.

Reprinted in *Annalen der Pharmacie*, Liebig's, 1839, Bd. 30, p. 86-105, *PKA*.

995. Blondeau, Ch. Action de l'ammoniaque sur l'amidon. (Extrait.) (Académie des sciences, Comptes rendus, Paris, 1864, tome 59, p. 403.)

*EO

A very brief abstract in which the compound of ammonia and starch is termed "amidiaque."

996. Tollens, Bernhard. Ueber die Verbindungen von Stärke mit Kali und Natron. (Auszug.) (Deutsche chemische Gesellschaft, Berichte, 1873, Jahrg. 6, p. 1390.)

PKA

997. Pfeiffer, Th., and BERNHARD TOLLENS. Ueber Verbindungen von Kohlehydraten mit Alkalien. (Annalen der Chemie, Liebig's, Leipzig und Heidelberg, 1881, Bd. 210, p. 285-309.)

PKA

The alkali compounds are obtained by adding an alcoholic solution of Na or K ethoxide to the carbohydrate triturated with water. The compound is precipitated by alcohol and after dissolving in water is reprecipitated with alcohol. The Na compound of starch contains 3.44% of Na and the K compound 5.25% K. The results with

dextrin indicate that its molecular weight more nearly approximates that of the sugars than that of starch. The compounds with amylo-dextrin vary according to its state of purity.

Abstract in *Jour. chem. soc.*, 1882, v. 42, p. 490-491; *ibid.*, 1883, v. 44, p. 307; *Bull. soc. chim. Paris*, 1882, nouv. série, tome 38, semestre 2, p. 206-207; *Central-Blatt für Agrikulturchemie*, Biedermann's, Leipzig, 1882, Jahrg. 11, p. 775-777.

998. Demoussy, Em. Sur les propriétés acides de l'amidon. (Académie des sciences, Comptes rendus, Paris, 1906, tome 142, p. 933-935.)

*EO

Contact with rice starch considerably lowers the titre of alkaline solutions. In the case of sodium carbonate, the diminution of the alkali titre is accompanied by the formation of an equivalent quantity of sodium hydrogen carbonate. Small quantities of neutral salts are absorbed by starch.

Reprinted in *Bull. assoc. chimistes*, 1906-07, tome 24, p. 208-210.

Abstract in *Jour. chem. soc.*, 1906, v. 90, part 1, p. 401; *Jour. soc. chem. ind.*, 1906, v. 25, p. 489; *Chem. Centr.*, 1906, Bd. 1, p. 1654; *Bull. assoc. chimistes*, 1905-06, tome 23, p. 1348.

999. Fouard, Eugène. Les propriétés colloïdales de l'amidon, en rapport avec sa constitution chimique. (Académie des sciences, Comptes rendus, Paris, 1909, tome 148, p. 502-505.)

*EO

Addition of increasing amounts of KOH to filtered solutions of colloidal starch causes a progressive decrease in the rotatory power, the original rotation returning when the alkali is neutralized. The rate of decrease indicates that, as a limit, the rotation of maltose will be reached.

Discussion by Tanret, *Bull. soc. chim. France*, 1909, série 4, tome 5, p. 310.

Reprinted in further detail in *Bull. soc. chim. France*, 1909, série 4, tome 5, p. 381-386.

Abstract in *Jour. soc. chem. ind.*, 1909, v. 28, p. 433; *Jour. chem. soc.*, 1909, v. 96, part 1, p. 209; *Chem. Zentr.*, 1909, Bd. 1, p. 1091.

1000. — La solubilisation de l'amidon colloïdal sous l'action des alcalis. (Société chimique de France, Bulletin, 1909, série 4, tome 5, p. 828-834.)

PKA

A characteristic adsorption curve is obtained upon plotting amounts of KOH fixed by starch against amounts of KOH in solution. The conductivity of solutions of ammonia and piperidine is diminished by addition of starch solution, whereas if the starch formed a compound due to its acidic properties, the conductivity would be increased.

Abstract in *Jour. chem. soc.*, 1909, v. 96, part 1, p. 699; *Jour. soc. chem. ind.*, 1909, v. 28, p. 898; *Chem. Zentr.*, 1909, Bd. 2, p. 974.

1001. Reyckler, Albert. Sur l'adsorption de certaines bases par l'amidon soluble. (So-

Starches and Dextrins, continued.

Reactions with Bases, continued.

ciété chimique de Belgique, Bulletin, Gand, 1909, tome 23, p. 378-383.) **PKA**

The experimental observations of Fouard are explained on the hypothesis that the reactions between soluble starch and bases take place according to Guldberg and Waage's law of mass action. Suggests that the compounds formed are similar to the alcoholates.

Abstract in *Jour. chem. soc.*, 1909, v. 96, part 2, p. 177.

1002. Fouard, Eugène. Sur la fixation de certaines bases par l'amidon soluble. (Société chimique de Belgique, Bulletin, Gand, 1910, tome 24, p. 105-109.) **PKA**

Discusses Reychler's interpretation (*en-ry 1001*) of his own results.

Abstract in *Jour. chem. soc.*, 1910, v. 98, part 1, p. 225; *Chem. Zentr.*, 1910, Bd. 1, p. 1006.

1003. Ferraud, and Bloch. De l'action de la soude sur l'amidon. (Bulletin des sciences pharmaceutiques, Paris, 1911, tome 18, p. 207-213.)

Available in Library of the Surgeon General's Office.

The weight of NaOH absorbed by starch in alcoholic liquids is a function of the quantity of alkali, the alcohol content of the liquid and, in very small quantities, the period of action. Allowances are made for this fact in a method for determining acidity of starches.

Abstract in *Chem. Zentr.*, 1912, Bd. 1, p. 287.

1004. Rakovski, Adam V. Adsorption. 5. Adsorption of substances dissolved in water by starch. [Title translated.] (Russian Physical Chemistry Society, Journal, St. Petersburg, 1912, tome 44, p. 586-605.) **PKA**

Finds that there is little or no adsorption of inorganic or organic acids or salts from

aqueous solutions by starch. Soluble alkalis (except ammonia) are, however, strongly adsorbed from aqueous solutions and the hydroxides of heavy metals from ammoniacal aqueous solutions. The detailed experimental results are given in tables and curves.

Reprint in *Zeitschrift für Chemie und Industrie der Kolloide*, 1912, Bd. 11, p. 51-58 (4), **PKA**.

Abstract in *Chem. Zentr.*, 1912, Bd. 2, p. 667; *Chem. abst.*, 1912, v. 6, p. 2348; *Jour. soc. chem. ind.*, 1912, v. 31, p. 891; *Jour. chem. soc.*, 1912, v. 102, part 2, p. 743; *Bull. soc. chim. France*, 1912, série 4, tome 12, p. 1411.

1005. — Adsorption. 8. Adsorption in mixed solutions. [Title translated.] (Russian Physical Chemistry Society, Journal, St. Petersburg, 1913, tome 45, p. 7-12.) **PKA**

Has investigated the adsorption by starch of alkali in presence of salts and of two alkalis simultaneously.

Reprint in *Zeitschrift für Chemie und Industrie der Kolloide*, 1913, Bd. 12, p. 128-130 (6), **PKA**.

Abstract in *Chem. Zentr.*, 1913, Bd. 1, p. 1384; *Jour. chem. soc.*, 1913, v. 104, part 2, p. 302; *Chem. abst.*, 1913, v. 7, p. 1837; *Bull. soc. chim. France*, 1913, série 4, tome 14, p. 787.

1006. — Adsorption. 9. Adsorption and hydrolysis. [Title translated.] (Russian Physical Chemistry Society, Journal, St. Petersburg, 1913, tome 45, p. 13-21.) **PKA**

A study of the equilibrium constants in aqueous alkali-starch systems. The 'amy-lates' (analogous to sucrales) show a fairly constant composition for arrowroot and potato starches.

Reprint in *Zeitschrift für Chemie und Industrie der Kolloide*, 1913, Bd. 12, p. 177-181 (7), **PKA**.

Abstract in *Jour. chem. soc.*, 1913, v. 104, part 2, p. 303; *Chem. abst.*, 1913, v. 7, p. 1837; *Chem. Zentr.*, 1913, Bd. 1, p. 1385.

1007. Schmid, L., and B. Becker. Alkaliverbindungen von Kohlenhydraten. (Deutsche chemische Gesellschaft, Berichte, Berlin, 1925, Jahrg. 58, p. 1966-1968.) **PKA**

Abstract in *Chem. abst.*, 1926, v. 20, p. 744.

REACTIONS WITH OXIDIZING AGENTS

1008. Liebig, Justus. Über einige Produkte, welche durch die Zersetzung mehrerer Salze mittelst Chlor erhalten werden. (Annalen der Physik und Chemie, Poggendorff's, Leipzig, 1829, Bd. 15, p. 541-572.) **PAA**

On p. 570 notes that starch is only slightly affected by the prolonged action of chlorine or chlorous acid.

1009. Pelouze, J. Note sur les produits de l'action de l'acide nitrique concentré sur

l'amidon et le ligneux. (Académie des sciences, Comptes rendus, Paris, 1838, tome 7, p. 713-715.) ***EO**

Starch is converted successively into xyloidin, a deliquescent acid and oxalic acid.

Reprint in *Annalen der Pharmacie*, Liebig's, Heidelberg, 1839, Bd. 29, p. 38-41, **PKA**; *Jour. für prakt. Chem.*, 1839, Bd. 16, p. 168-171, **PKA**.

1010. Langbein, Georg. Ueber das Verhalten des übermangansäuren Kali's zu einigen organischen Körpern. (Pharmaceu-

Starches and Dextrins, continued.

Reactions with Oxidizing Agents, continued.

tische Zeitschrift für Russland, St. Petersburg, 1868, Jahrg. 7, p. 573-579.)

Available in Library of Surgeon General's Office.

Finds that 1 gram of starch reduces $1\frac{1}{2}$ grams of KMnO_4 in acid solution.

Abstract in *Jahresber. Chem.*, 1868, p. 294.

1011. Habermann, J. Ueber die Oxydationsproducte des Amylums und Paramylums mit Brom, Wasser und Silberoxyd. (*Annalen der Chemie und Pharmacie*, Liebig's, Leipzig, 1874, Bd. 172, p. 11-15.)

PKA

Obtains gluconic and dextronic acids.

Abstract in *Jour. chem. soc.*, 1874, v. 27, p. 1077; *Bull. soc. chim. Paris*, 1874, nouv. série, tome 22, semestre 2, p. 368; *Jahresber. Chem.*, 1874, p. 879.

1012. Lieben, Ad., and REICHARDT. Ueber die Wirkung verschiedener Oxydationsmittel auf lösliche Stärke. (Auszug.) (*Deutsche chemische Gesellschaft, Berichte*, Berlin, 1875, Jahrg. 8, p. 1020.)

PKA

Investigate action of potassium permanganate, chromic acid, Br followed by Ag_2O , and nitric acid. Describe mono-nitrostarch.

Abstract in *Jahresber. Chem.*, 1875, p. 787.

1013. Wurster, C. Zur Kenntniss der Einwirkung des Wasserstoffsperoxyds auf Kohlehydrate und organische Säuren. (Auszug.) (*Deutsche chemische Gesellschaft, Berichte*, Berlin, 1889, Jahrg. 22, p. 145R.)

PKA

Notes that starch is not attacked by H_2O_2 at the ordinary temperature but is converted to dextrin and glucose by H_2O_2 in boiling alkaline or acid solution.

Also abstracted in *Jahresber. Chem.*, 1889, p. 2063.

1014. Lintner, Carl J. Über die Einwirkung von Kaliumpermanganat auf Stärke. (*Zeitschrift für angewandte Chemie*, Berlin, 1890, Jahrg. 3, p. 546-548.)

Available in Library of Chemists' Club.

When starch is treated with KMnO_4 at varying concentrations, CO_2 is evolved and MnO_2 is precipitated. A series of gummy acids are produced which are precipitated by lead acetate and by baryta. The products do not give colorations characteristic of C₅ groups.

Abstract in *Jour. chem. soc.*, 1891, v. 60, p. 537; *Chem. Centr.*, 1890, Bd. 2, p. 690; *Jahresber. Chem.*, 1890, p. 2151.

1015. Moissan, Henri. Nouvelles recherches sur le fluor. (*Annales de chimie et de physique*, Paris, 1891, série 6, tome 24, p. 224-282.)

PAA

On p. 269 notes that starch is attacked by fluorine in the cold with deposition of carbon.

1016. Asboth, Alexander von. Wirkung des Wasserstoffsperoxyds auf Stärke. (*Chemiker-Zeitung*, Cöthen, 1892, Jahrg. 16, p. 1517-1518, 1560-1561.)

†VOA

Upon treating starch with H_2O_2 , made slightly alkaline with NH_3 , liquefaction commences and oxygen and CO_2 are evolved. The liquid is filtered from the cellulose, which remains unattacked, and the products in the filtrate are fractionally precipitated with alcohol and BaOH_2 .

Abstract in *Jour. chem. soc.*, 1893, v. 64, part 1, p. 384; *Chem. Centr.*, 1892, Bd. 2, p. 867; *Jahresber. Chem.*, 1892, p. 2467.

1017. Petit, Paul. Sur un produit d'oxydation de l'amidon. (*Académie des sciences, Comptes rendus*, Paris, 1892, tome 114, p. 1375-1377.)

***EO**

Starch is treated with ordinary HNO_3 and heated at 40° for several days. The product contains 6% HNO_3 and when treated with water, nitrogen oxides and CO_2 are evolved. When dissolved and purified by reprecipitation an acidic product is obtained which reduces Fehling's solution, forms a hydrazone and has the composition $\text{C}_5\text{H}_8\text{O}_6$. This acid upon prolonged boiling is converted into a new acid with the composition $\text{C}_5\text{H}_8\text{O}_6$.

Abstract in *Jour. chem. soc.*, 1892, v. 62, p. 1171; *Chem. Centr.*, 1892, Bd. 2, p. 164.

1018. Cross, Charles F., and others. Die Chemie der Pflanzenfasern. Cellulosen, Oxycellulosen, Lignocellulosen. Von C. F. Cross, E. J. Bevan, und C. Beadle. (*Deutsche chemische Gesellschaft, Berichte*, Berlin, 1893, Jahrg. 26, p. 2520-2533.)

PKA

Note on p. 2523 that starch is oxidized by chromic acid yielding about 10% furfural.

1019. Schaeffer, Gustave, and OSCAR SCHEURER. Sur les fécules modifiées obtenues par MM. Siemens et Halske. (*Société industrielle de Mulhouse, Bulletin*, Mulhouse, 1893, tome 63, p. 363-366.)

VA

Tabulate physical and chemical properties of six starches.

Abstract in *Jour. soc. chem. ind.*, 1894, v. 13, p. 264.

1020. Chalmot, G. de. On the oxidation of complex carbohydrates. (*American chem-*

Starches and Dextrins, continued.

Reactions with Oxidizing Agents, continued.

cal journal, Baltimore, 1895, v. 17, p. 535-539.)

PKA

Notes that a starch suspension, after an hour's treatment with Br and NaOH, gives a slight precipitate with phenylhydrazine and reduces Fehling's solution. Verifies that neither Br nor NaOH alone have this effect.

Abstract in *Jour. chem. soc.*, 1895, v. 68, part 1, 587.

021. Dollfus, E., and F. SCHEURER. Sur les essais d'oxydation des matières amy-
lacées soumis par M. O. Schmerber. (Société industrielle de Mulhouse, Bulletin, Mulhouse, 1896, tome 66, p. 241-245.) VA

Verify observations of Schmerber (entry 022). Discuss previous work relating to treatment of starch by oxidizing agents.

Abstract in *Jour. soc. chem. ind.*, 1896, v. 15, p. 49.

022. Schmerber, Oscar. Note sur l'oxy-
dation des matières amy-
lacées. (Société industrielle de Mulhouse, Bulletin, Mulhouse, tome 66, 1896, p. 238-241.) VA

Effect of chloric and chromic acid, bleaching powder, manganese dioxide, and potassium permanganate upon starch. Starch treated with potassium permanganate forms a paste more liquid and transparent than ordinary starch paste.

Abstract in *Jour. soc. chem. ind.*, 1896, v. 15, p. 49.

023. Syniewski, Wiktor. Über die lös-
liche Stärke. (Deutsche chemische Gesell-
schaft, Berichte, Berlin, 1897, Jahrg. 30, p. 415-448.) PKA

Prepares soluble starch by using a cold solution of sodium peroxide. Finds the specific rotation increases with increasing concentration.

Abstract in *Jour. soc. chem. ind.*, 1897, v. 16, p. 829; *Chem. Centr.*, 1897, Bd. 2, p. 1107; *Bull. assoc. chimistes*, 1898-99, tome 16, p. 794; *Bull. soc. chim. Paris*, 1898, série 3, tome 20, p. 367.

024. — Über lösliche Stärke. 2. Deutsche chemische Gesellschaft, Be-
richte, Berlin, 1898, Jahrg. 31, p. 1791-1796.) PKA

$\alpha_D = 195.3^\circ$ for soluble starch prepared by action of sodium peroxide. Prepares bar-
m, acetyl and benzoyl derivative. Soluble starch was not regenerated by hydrolysis of the acetyl derivative.

Abstract in *Jour. soc. chem. ind.*, 1898, v. 17, p. 829; *Jour. chem. soc.*, 1898, v. 74, part 1, p. 551; *Chem. Centr.*, 1898, Bd. 2, p. 421; *Bull. soc. chim. Paris*, 1899, série 3, tome 22, p. 233.

1025. Haerz, E. Amylum, Amylodextrin und Erythrodextrin in ihrem Verhalten gegen Chromsäure. (Auszug.) (Wochen-
schrift für Brauerei, Berlin, 1905, Jahrg. 22, p. 721-722.)

Available in Library of Brewers' Academy.

Prepares amylo-dextrin and finds that it does not behave as a uniform substance, but seems to consist of a number of molecular groups which differ in complexity and density of internal structure. The same composite character was noted in erythro-dextrin II; the products obtained at the achroodextrin stage, however, seem to possess homogeneity.

Abstract in *Jour. soc. chem. ind.*, 1905, v. 24, p. 1315.

1026. Wolff, Jules. Sur quelques composés minéraux qui peuvent jouer le rôle de la diastase liquéfiante du malt. (Académie des sciences, Comptes rendus, Paris, 1905, tome 141, p. 1046-1048.) *EO

Prepares a new modification of starch, by acting upon potato starch with acid oxidizing solutions at the ordinary temperature. This modification possesses the usual properties of starch, but, upon treatment with a very weak alkaline solution at 70° , it is immediately liquefied. The ease of liquefaction is essentially dependent upon the intensity of the original oxidizing treatment.

Abstract in *Jour. soc. chem. ind.*, 1906, v. 25, p. 34; *Jour. chem. soc.*, 1906, v. 90, part 1, p. 66; *Chem. Centr.*, 1906, Bd. 1, p. 229; *Bull. assoc. chimistes*, 1905-06, tome 23, p. 955.

1027. Fernbach, Auguste, and JULES WOLFF. Transformations catalytiques de l'empois d'amidon. (International Congress of Applied Chemistry, 7th, London, 1909, Proceedings, section 6b, p. 124-128.) PKR

Investigate action of various acids, alkalis and salts as accelerators in the liquefaction of starch by hydrogen peroxide. A relatively large proportion of peroxide, acting alone, can effect complete conversion. Determine acidity produced during reaction.

Duplicate abstracts in *Jour. soc. chem. ind.*, 1909, v. 28, p. 847; *Chem. abst.*, 1910, v. 4, p. 1822-1823.

1028. Gatin-Gruzewska, Z. Sur les produits d'hydrolyse de l'amidon sous l'action de l'eau oxygénée. (Société de biologie, Comptes rendus, Paris, 1910, tome 68, p. 1084-1086.) QAA

In dilute solutions of H_2O_2 with starch at 37° erythrodextrin was separated, as also were achroodextrin and maltose but not glucose. Dextrins were given from the action of H_2O_2 on starch and glycogen but

*Starches and Dextrins, continued.**Reactions with Oxidizing Agents, continued.*

the mannogalactan of the locust tree, xylan and inulin gave no dextrins. — *Chem. abst.*

Abstract in *Bull. soc. chim. France*, 1911, série 4, tome 9, p. 405.

1029. Neuberger, Carl, and SOICHIRO MIURA. Über die hydrolysierende Wirkung des Wasserstoffsuperoxyds. (*Biochemische Zeitschrift*, Berlin, 1911, Bd. 36, p. 37-43.)

PPB

Starch is included among compounds investigated.

1030. Gerber, C. Saccharification de l'empois d'amidon par l'eau oxygénée seule ou en présence des amylases végétales et animales. (*Académie des sciences, Comptes rendus*, Paris, 1912, tome 154, p. 1543-1545.)

***EO**

Dilute solutions of H_2O_2 rapidly hydrolyze starch to maltose and dextrins. The effect of H_2O_2 on amylolytic activity varies with the origin of the amylase.

Abstract in *Jour. soc. chem. ind.*, 1912, v. 31, p. 654; *Chem. abst.*, 1912, v. 7, p. 91; *Chem. Zentr.*, 1912, Bd. 2, p. 244.

1031. — Formation du maltose, aux dépens de l'amidon par l'eau oxygénée. (*Société de biologie, Comptes rendus*, Paris, 1912, tome 72, p. 1002-1003.)

QAA

The action of H_2O_2 is somewhat similar to that of enzymes. Large quantities of the peroxide oxidize the maltose which is formed.

Abstract in *Chem. abst.*, 1914, v. 8, p. 138.

1032. Durieux, O. Action de l'eau oxygénée et du chlorure ferrique sur l'amidon. (*Société chimique de Belgique, Bulletin*, Gand, 1913, année 27, p. 90-97.)

PKA

Starch is very slightly acted upon by hydrogen peroxide or ferric chloride alone; a mixture of the two causes an appreciable saccharification. Studies rate of hydrolysis.

Abstract in *Jour. chem. soc.*, 1913, v. 104, part 1, p. 445; *Chem. abst.*, 1913, v. 7, p. 3552; *Jour. soc. chem. ind.*, 1913, v. 32, p. 440; *Chem. Zentr.*, 1913, Bd. 1, p. 1870.

1033-1034. Bamberger, Max, and JOSEF NUSSBAUM. Wasserstoffsuperoxyd als Lösungsmittel (vorläufige Mitteilung). (*Monatshefte für Chemie*, Wien, 1919, Bd. 40, p. 411-416.)

Available in Library of the Chemists' Club.

Note that 60% aqueous H_2O_2 solution dissolves starch, giving solutions which are

viscous or dough-like according to the concentration.

Abstract in *Jour. chem. soc.*, 1920, v. 118, part 1, p. 531; *Chem. Zentr.*, 1920, Bd. 3, p. 72.

1035. Fosse, R. Synthèses de l'acide cyanique par oxydation des substances organiques. (*Société chimique de France, Bulletin*, Paris, 1921, série 4, tome 29, p. 158-203.)

PKA

Notes that urea is formed when dextrin or starch is oxidized by calcium permanganate in the presence of ammoniacal copper oxide. If the reaction mixture is heated a 20% yield of urea may be obtained.

1036. Schmidt, Erich, and ERICH GRAU-MANN. Zur Kenntnis pflanzlicher Inkrusten. 1. Methode zur Reindarstellung pflanzlicher Skellets-substanzen. 1. (*Deutsche chemische Gesellschaft, Berichte*, Berlin, 1921, Jahrg. 54, p. 1860-1873.)

PKA

Note that starch is not attacked by ClO_2 .

1037. Fosse, R. Synthèse d'un principe azoté des végétaux, l'acide cyanhydrique, par oxydation de l'ammoniaque et des hydrates de carbone, de la glycérine ou de l'aldéhyde. (*Société de biologie, Comptes rendus*, Lille, 1922, tome 86, p. 175-178.)

QAA

Notes that starch, in the presence of concentrated ammonium and silver nitrate or mercuric oxide, is oxidized by calcium permanganate to form hydrocyanic acid.

1038. Reyckler, Albert. Sur l'amidon soluble ou amyloextrine. (*Société chimique de Belgique, Bulletin*, Bruxelles, 1923, tome 32, p. 221-227.)

PKA

Gives lengthy review of earlier methods for preparing soluble starch. Details a new method in which starch is digested with a dilute solution of HCl and $K_2Cr_2O_7$, the dichromate reduced with SO_2 , the liquid filtered and the residue washed and dried. Starch thus treated is rendered soluble in boiling water upon addition of a trace of alkali or NH_3 . The solution contains no microscopic particles, has an α_D of about 200° and is very stable.

Abstract in *Jour. soc. chem. ind.*, 1923, v. 42, p. 672A; *Chem. Zentr.*, 1923, Bd. 3, p. 199; *Chimie et industrie*, 1924, v. 11, p. 263; *Bull. soc. chim. France*, 1923, série 4, tome 34, p. 1407.

1039. Craik, James. The mechanism of the oxidation of typical carbohydrates with hydrogen peroxide and hypochlorous acid. (*Society of Chemical Industry, Journal*, London, 1924, v. 43, p. 171-177T.)

VOA

Notes that 0.43% $HOCl$ in the cold effects an 80-90% conversion of potato starch.

Abstract in *Chem. abst.*, 1924, v. 18, p. 2500; *Chem. Zentr.*, 1924, Bd. 2, p. 823.

Starches and Dextrins, continued.

Reactions with Oxidizing Agents, continued.

1040. Frère, J. Une forme nouvelle de chlore actif l'activine. (*Revue des produits chimiques*, Paris, 1924, année 27, p. 721-724.)

† PKA

Activin, the sodium compound of p-toluene-sulfochloramide, effects the solubilization of starch without appreciable degradation to dextrins and sugars.

1041. Haller, R. Über ein neues Verfahren zur Herstellung von löslicher Stärke. (*Textilberichte*, Melland's, Mannheim, 1924, Jahrg. 5, p. 389-390.)

VLA

Starch is solubilized by heating with water and "activin," the sodium compound of toluene-p-sulphochloramide.

Abstract in *American dyestuff reporter*, 1925, v. 14, p. 66-67.

1042. Palit, C. C., and N. R. DHAR. Induced oxidation of carbohydrates. (*Journal*

of physical chemistry, Ithaca, 1925, v. 29, p. 799-907.)

PKA

A stream of air is passed slowly through an alkaline solution of a carbohydrate in the presence of freshly precipitated cerous hydroxide or ferrous hydroxide and it is noted that the carbohydrate is oxidized into water and CO₂ in about 5.5 hours. The slow oxidation of the reducing substance is believed to induce oxidation of the carbohydrate. Of the carbohydrates investigated, starch was the most easily oxidized.

Abstract in *Chem. Zentr.*, 1925, Bd. 2, p. 1329.

1043. Syniewski, Wiktor. Über die Oxidation des Amylodextrins. (*Annalen der Chemie*, Liebig's, Leipzig and Berlin, 1925, Bd. 441, p. 277-285.)

PKA

By oxidation of amylopectin with Br₂ in presence of BaCO₃, obtains a white non-crystalline substance which has an acid reaction, $\alpha_D = 191^\circ$, R=23M, and is termed amylopectinic acid. The Ba salt is found to contain 15% BaO.

Abstract in *Chem. abst.*, 1923, v. 17, p. 1627; 1925, v. 19, p. 1250; *Jour. soc. chem. ind.*, 1922, v. 41, p. 951A; *Chimie et industrie*, 1923, v. 10, p. 1046; *Chem. Zentr.*, 1925, Bd. 1, p. 1486.

(To be continued)

INTERESTING RECENT ADDITIONS

ECONOMICS, SOCIOLOGY AND POLITICAL SCIENCE

American Sociological Society. The urban community; selected papers from the proceedings of the American Sociological Society, 1925, edited by Ernest W. Burgess... Chicago, Ill.: University of Chicago Press [cop. 1926]. xii, 268 p. diags., tables. 12°. (University of Chicago studies in urban sociology.) **SER**

Arnot, R. Page. History of the Labour Research Department. [London: Labour Research Dept., 1926. 62 p. tables. 8°. **TDA**

Ashley, Sir William James. Business economics. London: Longmans, Green and Co., Ltd., 1926. viii, 71 p. 12°. **TMD**

Lectures delivered in September, 1926, at the Commercial College at Copenhagen.

Barnes, George Nicoll. History of the International Labour Office. Preface by Émile Vandervelde... London: Williams and Norgate, Ltd., 1926. xvi, 106 p. illus. 12°. **TDO**

Bastiat, Frédéric. Bastiat and the A B C of free trade; translated from the writings of Frédéric Bastiat, and edited by Lorenza Garreau. London: T. F. Unwin, Ltd. [1926.] 127 p. 8°. **TK**

Beman, Lamar Taney. Selected articles on states rights... New York: The H. W. Wilson Co., 1926. lxvi, 362 p. tables, forms. 12°. **SAD**

Bibliography: p. xliv-lxvi.

Berthold, Otto, and E. SEELMANN-EGGEBERT. Die Deutsche Rentenbank und Deutsche Rentenbank-Kreditanstalt (Landwirtschaftliche Zentralbank); die geltende Gesetzgebung, bearbeitet und erläutert von Dr. rer. pol. O. Berthold und Dr. E. Seelmann-Eggebert... Berlin: R. Hobbing, 1926. 279 p. tables, chart. 12°. (Deutsche Wirtschaftsgesetze, Bd. 3.) **THI**

Birck, Laurits Vilhelm. The scourge of Europe; the public debt described, explained, and historically depicted. London: G. Routledge & Sons, Ltd., 1926. viii, 304 p. 8°. **TIF**

Brookes, Joshua Alfred Rowland. Murder in fact and fiction. New York: Brentano's [1926]. 284 p. 8°. **SLE**

Buck, Arthur Eugene. Municipal finance, by A. E. Buck, in collaboration with other staff members of the National Institute of Public Administration and the New York Bureau of Municipal Research. New York:

Macmillan Co., 1926. xii, 562 p. tables, diags. 12°. **SER**

Selected bibliography: p. 545-550.

Catlin, Warren B. The labor problem in the United States and Great Britain. New York: Harper Bros., 1926. x, 659 p. illus. 12°. **TDI**

Bibliographical footnotes.

Chase, Edward E. Maine railroads; a history of the development of the Maine railroad system. [Portland, Me.: Southworth Press, cop. 1926.] 145 p. charts. 12°. **TPR**

Colby, Charles Carlyle. Source book for the economic geography of North America... Chicago, Ill.: The University of Chicago Press [cop. 1926]. xxii, 549 p. tables, diags., maps. 8°. **TLB**

Bibliographies at end of most chapters.

Columbia University.—Business School. Scandinavian banking laws; a translation of the acts and regulations governing the central banks. New York: Columbia University, School of Business, 1926. 122 p. tables. 8°. **THG**

Dewing, Arthur Stone. The financial policy of corporations... New York: The Ronald Press Company [cop. 1926]. xix, 1281 p. rev. ed. 12°. **TG**

Diaz Dufoo, Carlos. Les finances du Mexique, 1892-1911; Limantour, l'homme et l'œuvre. Traduction française d'après la deuxième édition espagnole, par Albert Dupont... revue par l'auteur... Paris: F. Alcan, 1926. xi, 330 p. illus. [2. ed.] 8°. **TIF**

Ellingwood, Albert Russell, and W. COOMBS. The government and labor... Chicago: A. W. Shaw Company, 1926. xv, 639 p. 8°. **TDO**

Fialho, Octavio. Peut-on bolcheviser l'Amérique? Préface de Boris Souvarine... Paris: R. Picart [pref. 1926]. xxxii, 223 p. 12°. **SFN**

Finlay, J. C. The theory of gratuitous credit; an examination of the principles governing the abolition of the time element from exchange. Guildford, Eng.: Billings and Sons, Ltd. [1926.] ix, 272 p. 12°. **TFH**

Bibliographical footnotes.

Finney, Ross Lee. General social science... New York: The Macmillan Company, 1926. xx, 459 p. illus. charts. 12°. **SC**

Supplementary readings at end of chapters.

Fiodorov, Mikhail. La Russie sous le régime communiste; réponse au rapport de

Economics, Sociology and Political Science, continued.

la Délégation des trades-unions britanniques, basée sur la documentation officielle soviétique; avec une préface de Hubert Bourgin... Paris: Nouvelle librairie nationale, 1926. xii, 574 p. diagrs. 8°. **TAH**
Bibliographical footnotes.

Foreign Policy Association. State capitalism in Russia; the Soviet economic system in operation, 1917-1926, by Savel Zimand. [New York, 1926.] 77 p. charts, tables. [rev. ed.] 8°. **TAH**
Bibliography, p. 74-75.

Fourgeaud, André. La dépréciation et la revalorisation du mark allemand et les enseignements de l'expérience monétaire allemande... Paris: Payot, 1926. xvi, 284 p. tables. 8°. **TF**
Bibliography, p. 281-284.

Francis, Francis. The free trade fall. London: J. Murray, 1926. v, 132 p. 12°. **TK**

Fraser, Herbert F. Foreign trade and world politics; a study of the international foundations of prosperity with particular reference to American conditions... New York: Alfred A. Knopf, 1926. xiii, 346 p. 12°. **TLB**
Bibliography: p. 334-337.

Frederick, Justus George. Masters of advertising copy; principles and practice of copy writing according to its leading practitioners... New York: Frank-Maurice, Inc., 1926. 392 p. 8°. **TW**

Friedrich, Ernst G. Allgemeine und spezielle Wirtschaftsgeographie. Berlin: W. de Gruyter & Co., 1926. 2 v. 3. ed. rev. 8°. **TLB**
Contents: Bd. 1. Allgemeine Wirtschaftsgeographie. Bd. 2. Spezielle Wirtschaftsgeographie.

Fuller, Raymond Garfield, and MABEL STRONG. Child labor in Massachusetts; an inquiry under the auspices of the Massachusetts Child Labor Committee. Boston: Massachusetts Child Labor Committee, 1926. 170 p. tables. 12°. **TDL**

Gollomb, Joseph. Scotland Yard. London: Hutchinson & Co., Ltd. [1926.] 284 p. 8°. **SLG**

Granite Railway Company. The first railroad in America, a history of the origin and development of the Granite Railway at Quincy, Massachusetts. Privately printed for the Granite Railway Company in commemoration of the one hundredth anniversary. [Boston,] 1926. 29 p., 15 pl. 8°. **TPS (Quincy)**

Griffiths, George E. Co-operative propaganda; a handbook for propagandists and canvassers. Manchester: Co-operative Union, Ltd., 1926. 110 p. 16°. **SIO**

Hall, William Clarke. Children's courts. London: G. Allen & Unwin, Ltd. [1926.] 287 p. tables. 12°. **SLL**
Bibliographical footnotes.

Hardwick, Arthur. Memorable fires in London. Past and present. London: "Post Magazine," 1926. 243 p. 12°. **SX**

Hardy, Charles Oscar. Tax-exempt securities and the surtax... New York: The Macmillan Company, 1926. xx, 216 p. tables. 12°. **TIR**

Hayward, William Richart, and G. W. JOHNSON. The evolution of labor; past, present and future. London: Duckworth [1926]. 223 p. 12°. **TDI**

Hoag, Clarence Gilbert, and G. H. HALLETT. Proportional representation... New York: The Macmillan Company, 1926. xx, 546 p., 3 pl. illus. 12°. **SEH**
Select bibliography: p. 514-517.

Hobson, John Atkinson. The evolution of modern capitalism; a study of machine production. London: Walter Scott Publishing Co., Ltd., 1926. xvi, 510 p. diagrs., tables. new ed. rev. 12°. (The contemporary science series.) **TDC**

Huntington, Ellsworth, and S. W. CUSHING. Modern business geography... Illustrated with 101 maps & 84 photographs. Yonkers-on-Hudson, N. Y.: World Book Company, 1925. vii, 352 p. illus. tables, maps, diagrs. 8°. **TLB**

James, Harlean. Land planning in the United States for the city, state and nation; preface by Richard T. Ely; introduction by Albert Shaw. New York: Macmillan Co., 1926. xxx, 427 p., 19 pl. illus. diagrs. 12°. **SER**
"Suggested reading" at end of chapters.

Jerome, Harry. Migration and business cycles...with a foreword by Wesley C. Mitchell. New York: National Bureau of Economic Research, Inc., 1926. 256 p. tables, charts. 8°. (National Bureau of Economic Research. Publications. no. 9.) **TB (National)**

Kehr, Cyrus. A nation plan, a basis for co-ordinated physical development of the United States of America with a suggestion for a world plan. New York: Oxford University Press, American Branch, 1926. xvi, 210 p., 27 pl. 8°. **SER**

Kerr, Andrew William. History of banking in Scotland. London: A. & C. Black, Ltd., 1926. xv, 344 p. tables. 4. ed., rev. and enl. 8°. **THI**
Chapters XXIX-XXXIII, by Frank H. Allan — cf. pref. to 4. ed.

Klingberg, Frank J. The anti-slavery movement in England; a study in English humanitarianism... New Haven: Yale University Press, 1926. xii, 390 p. 8°. **SEKM**
Bibliography: p. 309-320.

Economics, Sociology and Political Science, continued.

Krueger, Karl, and G. R. POSCHARDT. Die Erdoel-Wirtschaft der Welt. Stuttgart: E. Schweizerbart G.m.b.H., 1926. xxx, 494 p. charts, diagrs., tables. illus. 4°. **TAK**

Kulemann, Wilhelm. Die Genossenschaftsbewegung... Berlin: C. Liebmann, 1922-25. 2 v. 8°. **SIO**

Lauck, William Jett. Political and industrial democracy, 1776-1926. New York: Funk & Wagnalls Co., 1926. x, 374 p. tables, plans. 12°. **TDC**

Leaf, Walter. Banking. London: Williams & Norgate, Ltd. [pref. 1926.] viii, 9-255 p. 16°. (Home university library of modern knowledge. v. 124.) **THD**

Lewinsohn, Richard. Histoire de l'inflation, le déplacement de la richesse en Europe; traduit de l'Allemand par H. Simon-det... Paris: Payot, 1926. 416 p. 8°. (Bibliothèque politique et économique.) **TAH**

Lorbert, A. La France au travail. Champagne, Franche-Comté et Jura; l'arrière-est de l'Île-de-France à la frontière suisse. Paris: P. Roger, 1926. 286 p. map, plates. 8°. (Les pays modernes.) **TAH**

Macara, Sir Charles Wright, bart. Modern industrial tendencies. Manchester: Sherratt & Hughes, 1926. xii, 259 p. 12°. **TAK**

Maciver, Robert Morrison. The modern state. Oxford: Clarendon Press, 1926. xii, 504 p. 8°. **SEC**

McMichael, Stanley L. Selling real estate ... Cleveland, O.: The Stanley McMichael Publishing Organization, 1926. 448 p. illus. 8°. **TET**

Magee, James Dysart. An introduction to money and credit... New York: F. S. Crofts & Co., 1926. viii, 467 p. tables, charts. 12°. **TF**

Suggested readings at end of chapters.

Mathieson, William Law. British slavery and its abolition, 1823-1838. London: Longmans, Green and Co., Ltd., 1926. x, 318 p. 8°. **SEKM**

Milnes, Nora. The economics of wages and labour. London: P. S. King & Son, Ltd., 1926. vii, 197 p. 8°. **TB**

Mohr, Anton. The oil war... New York: Harcourt, Brace and Company [cop. 1926]. vii, 267 p. 12°. **TAK**

Monkswell (3rd baron), Robert Alfred Hardcastle Collier. The railways of Great Britain. London: G. Bles [1926]. xvi, 17-254 p. illus. [new ed.] 8°. **TPN**

Nearing, Scott. The British general strike; an economic interpretation of its background and its significance, with an

introduction by Ellen Wilkinson... New York: Vanguard Press, 1926. xxi, 186 p. 12°. **TDG**

Örne, Anders Emanuel. Co-operative ideals and problems, translated by John Downie. Manchester: Co-operative Union, Ltd., 1926. xvii, 143 p. tables. 8°. **SIO**

Pearson, Edmund Lester. Murder at Smutty Nose, and other murders. Garden City: Doubleday, Page & Co., 1926. x, 330 p., 24 pl. 12°. **SLN**

Radford, George. Manifestoes. [London:] Our Land Press [1926]. xxvi, 227, 201, 39 p. 4°. **TB**

Contents: Apologia. 1. The state as farmer. Agricultural organization. Our food supply. The state as banker, &c. 2. Autolycus. The philosophy of book-keeping. Our land. A plain man's faith. Sketches.

Ralston, Jackson Harvey. The law and procedure of international tribunals, being a résumé of the views of arbitrators upon questions arising under the law of nations ... [Palo Alto,] California: Stanford University Press, Stanford University [cop. 1926]. xl, 512 p. 8°. **XBL**

Cases cited: p. xiii-xx.

Abbreviations and authorities cited: p. xxi-xxiii.

Redford, Arthur. Labour migration in England, 1800-50... Manchester: University Press, 1926. xvi, 174 p., 7 maps. tables. 12°. (Victoria University of Manchester. Economic history series. no. 3.) **TB (Victoria)**

Bibliographical footnotes.

Remer, Charles Frederick. The foreign trade of China. Shanghai, China: The Commercial Press, Ltd., 1926. xii, 269 p. tables, diagrs. 8°. **TLH**

Robertson-Scott, J. W. The story of the women's institute movement in England & Wales & Scotland. Idbury: The Village Press, 1925. xv, 289 p. tables. illus. 12°. **SNA**

Rommenhoeller, C. G. La Grande-Roumanie; sa structure économique, sociale, financière, politique et particulièrement ses richesses. La Haye: M. Nijhoff, 1926. vii, 634 p. diagrs., tables. 8°. **TAH**

Rönholm, Nils. Ekonomisk geografi, med produktions- och samfärdselskartor... Stockholm: A. Bonniers förlag [1926]. 393, xiv p. plans, tables, maps. 5. ed. 8°. **TLB**

Rose, Frank Herbert. Our industrial jungle, with a preface by the Right Honourable J. R. Clynes... London: Faber and Gwyer [1926]. xxii, 178 p. 12°. **TDI**

Spingarn, Arthur Barnett. Laws relating to sex morality in New York City, by Arthur B. Spingarn, revised by W. Bruce Cobb. New York: Century Co., 1926. xiv, 171 p. table. 12°. **SNY**

Stamp, Sir Josiah Charles. The Christian ethic as an economic factor... London:

Economics, Sociology and Political Science, continued.

The Epworth Press [1926], 106 p. 8°. Social Service Lecture Trust, London. (The social service lecture. 1926.) **TB**

Stefani, Alberto de', editor. Lezioni sugli ordinamenti finanziari italiani, a cura di Alberto de' Stefani... Roma: Stabilimento litografico per l'amministrazione dello stato. 1925. 490 p. tables. 8°. **TIF**

Stephenson, Gilbert Thomas. Living trusts, including life insurance trusts. New York: F. S. Crofts & Co., 1926. xv, 431 p. tables, forms. 12°. **SIH**

Suhr, Otto. Die Welt der Wirtschaft vom Standort des Arbeiters; eine Einführung in das Verständnis des kapitalistischen Wirtschaftsgebäudes, und eine Anleitung zur Beobachtung des kapitalistischen Wirtschaftslebens. Jena: Gewerkschafts-Archiv, 1926. 191 p. illus. 8°. (Gewerkschafts-Archiv-Bücherei. Bd. 4.)

TDR (Gewerkschafts)

Sumner, William Graham, and A. G. KELLER. The science of society. v. 1. New Haven: Yale University Press, 1927. 8°. **SC**

Thorp, Willard Long. Business annals; United States, England, France, Germany, Austria, Russia, Sweden, Netherlands, Italy, Argentina, Brazil, Canada, South Africa, Australia, India, Japan, China... with an introductory chapter by Wesley C. Mitchell and a foreword by Edwin F. Gay... New York: National Bureau of Economic Research, Inc., 1926. 380 p. tables, charts. 8°. (National Bureau of Economic Research. Publications. no. 8.) **TB (National)**

Bibliography: p. 360-380.

Upson, Lent Dorton. Practice of municipal administration... New York: Century Co. [cop. 1926.] x, 588 p. tables, chart. 8°. **SER**

Bibliographical footnotes.

Walras, Léon. Éléments d'économie politique pure; ou, Théorie de la richesse sociale. Paris: R. Pichon et R. Durand-Rozias, 1926. xx, 491 p. diagrs. rev. and nl. ed. 8°. **TC**

Walter, Hubert Conrad. Foreign exchange and foreign debts. London: Methuen & Co., Ltd. [1926.] xiii, 242 p. 2°. **TFG**

Bibliography: p. 237-238.

Wieser, Friedrich, Freiherr von. Das Gesetz der Macht. Wien: J. Springer, 1926. v, 562 p. 8°. **SE**

Williams, Judith Blow. A guide to the printed materials for English social and economic history, 1750-1850... New York: Columbia University Press, 1926. 2 v. 8°. Records of civilization: sources and studies.) **TAD**

Woody, Carroll Hill. The Chicago primary of 1926, a study in election methods. Chicago, Ill.: University of Chicago Press [cop. 1926]. vii, 299 p. tables, forms. 12°.

SER
Woodroffe, Sir John George, editor. Criminal procedure in British India (being a commentary on act v of 1898, as amended up to date). Calcutta: Thacker, Spink & Co., 1926. lxxiv, 827 p. tables. 4°. **SLM**

INDUSTRIES AND INDUSTRIAL ARTS

*Arthur, William. New building estimators' handbook, a handbook for architects, builders, contractors, appraisers, engineers, superintendents and draftsmen. New York: Scientific Book Corporation, 1926. xviii, 1018 p. illus. 14. ed. rev. and enl. 12°. \$6.00. **VEC (121)**

First edition, 150 pages, was published in 1909. Now expanded to over 1,000 pages and reset in smaller but equally legible type. Has new tables for estimating building quantities and wages. Limited strictly to new construction and repairs.

Barry, T. Hedley, and others. The chemistry of the natural and synthetic resins, by T. Hedley Barry, Alan A. Drummond, and R. S. Morrell. London: Ernest Benn, Ltd., 1926. vii, 196 p. 8°. (Oil and colour chemistry monographs.) 21s. **VOP (119)**

Natural resins have been confined to those used in the manufacture of varnishes; and Mr. Barry, who writes this section, has had the expert assistance of Dr. J. C. Willis, who outlines the botanical aspects. Mr. Drummond and Dr. Morrell provide up-to-date information on the synthetic resins, summarize recent practice, and discuss the fundamental principles of resinification as far as present knowledge permits. Numerous citations to patent specifications.

Reviewed in *Industrial chemist*, Nov., 1926.

Cave, Herbert. Fertilizers, their sources, manufacture, and uses. London and New York: Isaac Pitman and Sons, 1926. xi, 116 p. illus. 12°. \$1.00. **VPH (Stack 3)**

Concise, non-technical work for the general and commercial reader.

*Christensen, Anker L. Tool control, procurement, storage, issue, use, repairs and cost. New York: The Ronald Press Company, 1926. xvi, 134 p. illus. 8°. \$3.50. **VFV (121)**

"A practical outline, or method, for having the correct tool, in a workable condition, delivered to the place needed, at the proper time. The information has been collected chiefly from a tool-control system introduced by the author, supplemented by data obtained from various factory executives, engineers, foremen, and tool manufacturers. The system as laid forth is intended to economically cover the requirements of large plants, yet elastic enough to suit the needs of smaller organizations... It can be used, without hesitation, as a working manual for the organization of a tool crib."—*American machinist*, Dec. 16, 1926.

Corson, M. G. Aluminum. The metal and its alloys (a critical descriptive treatise). Including chapter on "structurography," prepared in cooperation with J. R. Vilella. New York: D. Van Nostrand Company, 1926. xx, 291 p. illus. 8°. \$8.00. **VIT (117)**

The greater part is devoted to the description of definite systems of binary and ternary alloys, showing

Industries and Industrial Arts, continued.

the fields of composition which are or may be used, and the properties which can be obtained or expected from them. There are chapters on the properties of metallic aluminum, technology of the alloys, corrosion, application of alloys to engineering work, and metallography. Richly illustrated with diagrams and photomicrographs. Mr. Corson is Research Metallurgist of the Union Carbide and Carbon Research Laboratories.

* The "Eötvös" torsion balance. London: L. Oertling, Ltd., 1926. 90 p. illus. 8°. 21s. **VBDN (121)**

Theory and manipulation of this sensitive prospecting instrument described in detail.

* Flood, G. M. Sewage treatment and disposal, a manual for municipal and sanitary engineers and managers of sewage disposal works. London: Blackie and Son, Ltd., 1926. vi, 163 p. illus. 8°. 10s. **VDI (121)**

Discusses modern methods in their physical, chemical, biological and financial aspects.

"It is, of course, impossible to deal with all these matters in great detail within the compass of the 157 pages available, but the author appears to possess great powers of compression and has gathered together an enormous amount of information of considerable value." — *Surveyor*, Oct. 29, 1926.

Friend, J. Newton. Iron in antiquity. London: Charles Griffin and Company; Philadelphia: J. B. Lippincott Company, 1926. viii, 221 p. illus. 12°. \$5.00. **VIP (117)**

Pleasantly written account of the prehistoric use of metals, the changes in nomenclature, the use of iron as ornament and currency, and its history as shown in the prose and poetry of various countries.

Reviewed in *Iron trade review*, Sept. 23, 1926; *Ironmonger*, July 17, 1926; *Engineering and mining journal*, July 31, 1926.

Hoar, Roger Sherman. Patents. What a business executive should know about patents. New York: The Ronald Press Company, 1926. vii, 232 p. 12°. \$4.50. ***V (121)**

"The patent law is a highly specialized and technical field of jurisprudence. Its practitioners have shrouded it with more mystery, obscure terminology, and hocus-pocus than any other legal domain... It is the object of this book to eliminate the above-mentioned superfluities from so much of the law and practice of patents as is essential for a business executive to understand." — *Preface*.

Hool, George A., and H. E. PULVER. Concrete practice, a textbook for vocational and trade schools. New York: McGraw-Hill Book Company, Inc., 1926. xiii, 369 p. illus. 8°. \$3.00. **VEO (121)**

Section I, dealing with general considerations, is followed by 107 "jobs" covering proportioning, mixing, and placing; contracts, specifications, and plans; estimating; laboratory methods; field work. The appendices include standard specifications and methods. Authors are associated with the University of Wisconsin.

Kronquist, Emil F. Metalcraft and jewelry. Peoria, Illinois: The Manual Arts Press, 1926. 191 p. illus. 12°. \$2.00. **MNR**

For workers in silver, brass, and copper, giving detailed instructions for making simple jewelry, such as brooches, pins, and rings; also silver and brass pieces, including hand hammered bowls, candle sticks,

wall lanterns and drawer pulls. The various tools are described and their uses explained. Emphasizes good design.

McCullough, Ernest. Practical structural design in timber, steel and concrete, a text and reference work for engineers, architects, builders, draftsmen and technical schools; especially adapted to the needs of self-tutored men. New York: Scientific Book Corporation, 1926. 416 p. diags. 8°. \$4.00. **VEC (121)**

Clear presentation, with simple mathematics, of the various forces and calculations involved in the different elements of construction. Considerable new material has been added to this edition, including a concise treatment of reinforced concrete.

Reviewed in *Engineering world*, Feb., 1927.

* Mellor, J. W. A comprehensive treatise on inorganic and theoretical chemistry. Volume VII. London and New York: Longmans, Green and Company, 1927. x, 977 p. diags. 8°. \$20.00. **PNB (119)**

Seventh volume of this notably complete work covers titanium, zirconium, hafnium, thorium, germanium, tin, lead, and inert gases. As in the previous volumes, the bibliographical references are remarkably full.

Mitchell, J. Shipbuilding and the shipbuilding industry. London and New York: Isaac Pitman & Sons, 1926. xi, 116 p. illus. 12°. \$1.00. **VXH (121)**

Brief, non-technical account of modern ship evolution, types of ships, business of ordering a new craft, the shipyard, designing, building, launching, motive power, maintenance and repair, the ship at sea and in port, and a peep into the future.

Ostwald, Wolfgang. Practical colloid chemistry, with the collaboration of P. Wolski and A. Kuhn, translated by I. N. Kugelmass and T. K. Cleveland. London: Methuen and Company, Ltd., 1926. xvi, 191 p. illus. 12°. 7s.6d. **PLD (119)**

"Essentially an elementary experimental development of colloidal chemistry intended for students or practitioners who desire thoroughly to learn the subject in the laboratory. The experiments are purely qualitative, are carried out with simple material and apparatus, and are directed towards clothing the dry bones of speculative and theoretical colloidal chemistry with the warm flesh of convincing objective illustration." — *Chemical trade journal*, Nov. 5, 1926.

Page, Victor W. The model T Ford car, including Fordson farm tractor... a most comprehensive practical treatise outlining the basic principles of operation of all Ford car and truck units with complete instructions for driving, servicing and repairing. New York: The Norman W. Henley Publishing Company, 1926. 495 p. illus. rev. and enl. ed. 12°. \$2.00. **TON (121)**

"This edition includes a description of the changes made in the Ford car for the coming season but these are more in the nature of detail refinements, so the instructions given apply, for the most part, to all Model T Ford cars that have ever been produced." — *Preface*.

* Russell, Edward J. Soil conditions and plant growth. London and New York: Longmans, Green and Company, Ltd., 1927. viii, 516 p. illus. 8°. \$6.50. **PPE (119)**

For notice of the 4. edition (1921, 406 p.), see *New technical books*, 1921, v. 6, p. 36. With exception

Industries and Industrial Arts, continued.

of the historical portion, the new edition shows much rewriting, with emphasis on the new developments in soil chemistry. Contains methods for soil analysis and a selected bibliography.

Searle, Alfred B. Cement, concrete and bricks. New York: D. Van Nostrand Company, 1926. x, 441 p. illus. 2.ed. 8°. \$6.00.
VEO (121)

"The introduction and extensive use of cements of an entirely different nature from Portland cement have very considerably added to the bulk of material that now has to be handled in a text-book that sets out to be anything like a comprehensive work of reference. In addition very considerable developments have taken place during the past few years in the various theories relating to the cements, particularly in the domain of their hardening and setting... Consequently it was high time that Mr. Searle gave us an up-to-date second edition of his valuable work, and we can testify to the thoroughness with which he has discharged his obligation." — *Industrial chemist*, Aug., 1926.

Also reviewed in *Engineering*, Oct. 1, 1926.

Stone, Ellery W. Elements of radio communication. New York: D. Van Nostrand Company, 1926. ix, 433 p. illus. 3. ed. rev. & enl. 12°. \$3.00.
TTF (121)

"Opportunity has been taken at this time to revise the text thoroughly, and to add new material, photographs and diagrams. Considerable recent data on radio-frequency generators, the modern Poulsen arc, the radio compass, antenna-ground circuits, aircraft radio, vacuum tubes and radio-telephone broadcasting and reception have been included." — *Preface*.

Reviewed in *Electrical world*, July 10, 1926; *Electric journal*, Aug., 1926.

Stoughton, Bradley, and Allison Butts. Engineering metallurgy, a textbook for users of metals. New York: McGraw-Hill Book Company, Inc., 1926. xi, 441 p. illus. 8°. \$4.00.
VIB (117)

Elementary, covering a short course in the general characteristics of metals and alloys, examination and testing, occurrence, smelting, dressing and refining, electrometallurgy, adapting metals and alloys to engineering use, properties and uses of the ferrous metals, producing and refining iron and steel, the non-ferrous metals, corrosion and its prevention, fuels and combustion, slags, fluxes, refractories, pyrometry, and heat transfer and heat losses in industrial furnaces.

Reviewed in *American machinist*, Dec. 23, 1926; *Industrial engineer*, Dec., 1926.

Watkins, J. H. Successful crystal and one valve circuits. A book for wireless experimenters, and all who wish to improve the performance of their crystal receivers. London and New York: Isaac Pitman and Sons, 1926. xi, 101 p. 12°. \$1.00.
TTF (121)

Contains 86 diagrams of tested circuits with descriptive text.

BOOK PLATES

This is a list of some of the books added in the last five years or so. It indicates a very considerable interest in the subject, in various countries, as well as a great variety in taste and in expression. The latter, in its finest and most satisfactory form, will of course represent the owner's desires and the designer's artistry in proper combination and restraint. With

the modern preference for the pictorial book plate, as contrasted with the armorial plate so generally used in former days, this matter becomes one of especial importance. The usefulness of well-illustrated books on the subject is obvious.

General Works

Almanach de l'ex-libriste. année 1921. Paris: H. Daragon [1921]. illus. 12°.
MDVA

American Society of Bookplate Collectors and Designers. Washington, D. C. Year book. 1923. Sewanee, Tenn., 1923. illus. 4°.
MDVA

The Bookplate annual. 1921-25. Kansas City, Mo., 1921-25. illus. f°.
MDVA

Editor: 1921, H. A. Fowler.

The Bookplate magazine. v. 1-2 (July, 1919-Sept., 1921). London: Moreland Press, 1919-21. illus. 4°.
MDVA

Irregular.

Numbering continuous.

Editor: J. J. Guthrie.

No more published.

Boulard, L. Marques de livres, anciennes et modernes, françaises et étrangères. Paris: L. Giraud-Badin, 1925. viii, 517 p. tables. illus. 8°.
MDVK

Davenport, Cyril James H. Cameo book-stamps, figured and described by Cyril Davenport... London: E. Arnold, 1911. xvi, 207 p. illus. 4°.
MDVC

Fowler, Alfred. A directory of bookplate artists with notes concerning their work, edited and compiled by Alfred Fowler. Kansas City [Mo.]: A. Fowler, 1921. 29 p. 8°.
MDVC

Fuller, George Washington, editor. A bibliography of bookplate literature, edited, with a foreword, by George W. Fuller, bibliographical work by Verna B. Grimm, Some random thoughts on bookplate literature, by Winward Prescott. Spokane: Public Library, 1926. 151 p. 8°.
MDV

Special Countries

Braungart, Richard. Deutsche Exlibris und andere Kleingraphik der Gegenwart. München: H. Schmidt [cop. 1922]. 104 p., 1 l. 8°. (Die Kunstbreviere. Reihe 5, Bd. 1.)
MDVK

— Das Exlibris der Dame. München: F. Hanfstaengl, 1923. 40 p., 96 pl. illus. 4°.
MDVK

— Das moderne deutsche Gebrauchs-Exlibris... München: F. Hanfstaengl, 1922. 101 p. illus. 8°.
MDVK

Plates printed on both sides.

— Neue deutsche Exlibris; mit einleitendem Text von Richard Braungart. Zweite Folge. München: F. Hanfstaengl, 1919. 2 p.l., vii-xxxv p., 4 l., 96 pl. 4°.
MDVK

Each plate accompanied by guard sheet, with name of artist.

Book Plates — Special Countries, continued.

Frost-Hansen, Poul. Danske Ex-libris. København: Hertz, 1915. 6 l. illus. sq. 8°.

MDVK

Author's pseud., Otto Wang, at head of title.

— Danske Exlibris i ny Gennemgang. Kolding: V. Schaeffers Forlag, 1925. 35 p. illus. 4°.

MDVK

Author's pseud., Otto Wang, at head of title.

— Nyere danske Ex-libris. København: S. Hasselbalch, 1916. 15 p. illus. 8°.

MDVK

Author's pseud., Otto Wang, at head of title.
Plates printed on both sides.

Gade, Gerhard. Norwegian ex libris. Boston: The Society of Book-plate Bibliophiles, 1917. [52] p. illus. 8°. (The Society of Book-plate Bibliophiles. Publication no. 2.)

MDVK

Havermans, Xavier, firm, Paris. Ex-libris français modernes. Paris: X. Havermans, 1921. 73 p. illus. 8°.

MDVK

Preface signed: George Lambert.

— Ex-libris modernes en France. Paris: X. Havermans [1923]. 3 l., 35 pl. 8°.

MDVK

Howard, Joseph Jackson. The Wardour Press series of armorial bookplates. Barons. From the collections of Joseph Jackson Howard... London: Mitchell and Hughes, 1895. 2 p.l., 27 p., 2 l. illus. 4°.

† MDVK

Schramm, Albert, editor. Taschenbuch für Exlibris-Sammler, hrsg. von Prof. Dr. Albert Schramm... Jahrgang 1. Leipzig: W. Goldmann [1924]. illus. 16°.

MDVC

Stoeber, Auguste. Petite revue d'ex-libris alsaciens... Mulhouse: Veuve Bader et Cie., 1881. 43 p., 1 pl. 12°.

MDVK

Vorsterman van Oyen, Anthonie Abraham. Les dessinateurs néerlandais d'ex-libris. Arnhem: Archives généalogiques & héraldiques, 1910. 4 p.l., 40 p., 6 l., 70 pl. f°.

† MDVK

Wiggishoff, Jacques Charles. Dictionnaire des dessinateurs et graveurs d'ex-libris français. Paris: Société française des collectionneurs d'ex-libris, 1915. 2 p.l., 278 p., 1 l., 32 pl., 1 port. illus. f°.

† MDVK

Some Individual Artists

Brangwyn, Frank. Bookplates. London: Morland Press, Ltd., 1920. 19 p., 70 pl. 4°.

MDVK

Carver, Clifford Nickels. Check-list of book plates engraved on copper by Arthur N. Macdonald; ed. by Clifford Nickels Carver. Princeton, N. J.: Privately printed [Princeton University Press], 1914. 3 p.l., v-viii, 24 p., 3 pl. 12°.

MDVK

Frost-Hansen, Poul. En dansk Ex-libris Kunstner, Ebbe Kornerup. København:

Erslev & Hasselbalch, 1914. 15 p. illus. 8°.

MDVK (Kornerup)

Author's pseud., Otto Wang, at head of title.

Guthrie, James Joshua. A book of intaglio bookplates, by James Guthrie; a selection of 20 designs printed in colours from the plates by hand by the artist at his press. Bognor: The Pear Tree Press, 1924. 22 l. illus. 4°.

MDVK

no. 23 of 50 copies printed.

— Bookplates by Henry J. Stock, R. I. Kansas City: A. Fowler, 1920. 2 p.l., 7-19 (1) p. illus. 8°.

MDVK

Harding, Dorothy Sturgis. The bookplates of Dorothy Sturgis Harding; with text by C. Howard Walker. Boston: The Graphic Arts Company, 1920. [5] p., 1 l., 23 pl. 8°.

MDVK

Harrod, Stanley. A catalogue of bookplates designed by Stanley Harrod... Kansas City: A. Fowler, 1919. 18 p. illus. 8°. (The bookplate brochures series. number one.)

MDVK

Moring, Thomas, engraver. One hundred book plates, engraved on wood, by Thomas Moring. Toronto: Musson Book Co., Ltd. [190-?] 3 p.l., xxv p., 100 pl. 8°.

MDVK

Introduction signed: A. M.

Rodo, Ludovic. Ex-libris and marks by Ludovic Rodo; introduction by Frank Brangwyn... London: The Morland Press, 1921. 16 l. illus. 4°.

MDVK

Teall, Gardner Callahan. Bookplates by Sidney L. Smith, with a check-list of the bookplates. Kansas City: A. Fowler, 1921. 18 p. illus. 8°.

MDVK

Viner, George Heath. A descriptive catalogue of the bookplates designed and etched by George W. Eve, R. E., with a brief notice of his career as an artist and a few comments upon some of his other work. Kansas City: The American Bookplate Society, 1916. 93 p., 8 pl., 1 port. ob. 8°.

MDVK (Eve)

Waller, Pickford. Bookplates by Pickford Waller. [v.] 2. London: The Morland Press, 1921. illus. 4°.

MDVK

Introduction signed: W. G. Blaikie Murdoch.

ART

Aitken, Robert Ingersoll. Arnold W. Brunner and his work, by Robert I. Aitken, Edwin H. Blashfield, Daniel C. French, Clayton Hamilton, J. Horace McFarland, Brander Matthews, Brand Whitlock, Charles Harris Whitaker. New York: Press of the American Institute of Architects, Inc., 1926. 47 p., 2 l. illus. f°.

† MQZ (Brunner)

Cox, George James. Art, for amateurs and students. Garden City, N. Y.: Doubleday,

Art, continued.

lay, Page and Company, 1926. xx p., 1 l., 105 p., 2 l., 36 pl. illus. 4°. **MA**

Huebner, Paul Gustav. Schloss Sanssouci. Berlin: Deutscher Kunstverlag, 1926. 80 p., 17 pl., 1 port. illus. 8°. **MQWD**

Koch, Alexander, editor. Farbige Wohnräume der Neuzeit; preisgekrönte Entwürfe und ausgeführte Räume in 140 farbigen und schwarzen Abbildungen; hrsg. von Alexander Koch. Darmstadt: A. Koch, G.m.b.H. 1926.] 10 p., 4 l., 106 pl. f°. **† MLO**

Kunstindustrimuseet, Kristiania. Kunstindustrimuseet i Oslo i femti aar 1876-1926, v. Hans Dedekam... Oslo: Det Mallingske bogtrykkeri, 1926. 227 p. illus. 4°. **† MAVY (Oslo)**

Ludovici, Anthony Mario. An artist's life in London and Paris, 1870-1925. London: F. F. Unwin, Ltd. [1926.] 209 p. illus. 8°. **MCV**

Nicolas, Raoul, of Bern, and **AUGUST KLIPSTEIN**. Die schoene alte Schweiz; die Kunst der Schweizer Kleinmeister. Stuttgart: Montana-Verlag, A.-G. [cop. 1926.] 102 p., 73 pl. f°. **† MCY**
Issued in 7 parts.

Oman, Sir Charles William Chadwick. Castles. Garden City, N. Y.: Doubleday, Page & Co., 1926. xii, 229 p. illus. 4°. **MQWK**

Paris. — Exposition internationale des arts décoratifs et industriels modernes, 1925. Bâtiments et jardins; cent planches en héliogravure, avec une introduction et des notices par M. Roux-Spitz... Paris: A. Lévy [1925]. 55 p., 100 pl. diags. f°. **† MRE**

— Dentelles de l'Europe centrale... avec une introduction de Marie Dormoy. Paris: A. Lévy [1926]. 6 l., 64 pl. f°. **† MOX**

Pettorelli, Arturo. Il bronzo e il rame nell' arte decorativa italiana; duecentovincinque tavole, (400 soggetti) riproduzioni in parte inedite di opere dal periodo etrusco all' epoca moderna; testo esplicativo, studio sulla tecnica fusoria e saggio bibliografico. Milano: U. Hoepli [1926]. 314 p. illus. f°. Collezione artistica Hoepli.) **† MGR**

Philippi, Adolf. Florenz; vierte Auflage bearbeitet von Walther Heil... Leipzig: A. Seemann, 1926. 388 p. illus. 4. ed. 2°. (Berühmte Kunststätten. Bd. 73-74.) **MAMC**

Putna (monastery), Rumania. Le trésor byzantin et roumain du monastère de Poutna... Paris: P. Geuthner, 1925. x, 86 p., and atlas of 60 pl. f°. **† MAI**

Rathbun, Seward Hume. A background to architecture. New Haven: Yale University Press; London: H. Milford, Oxford University Press, 1926. xx, 395 p. illus. 8°. **MQK**

Richter, Gisela Marie Augusta. Ancient furniture; a history of Greek, Etruscan and Roman furniture... with an appendix by Albert W. Barker... Oxford: Clarendon Press, 1926. xxxviii, 191 p. illus. 4°. **† MOF**

Saint-Sauveur, Hector, pseud. Les beaux jardins de France; introduction de R. Ed. André... Paris: C. Massin [1926]. 23 p., 44 pl. f°. **†† MSK**

Saylor, Henry Hodgman. Bungalows; their design, construction and furnishing, with suggestions also for camps, summer homes and cottages of similar character; illustrated by photographs and plans. New York: R. M. McBride & Company, 1926. 6 p.l., 206 p., 2 l. illus. 4°. **MRGG**

Séguy, E. A. Floréal; dessins & coloris nouveaux. Paris: A. Calavas [192-?]. 19 col'd pl. f°. **††† MLD**

Sexton, Randolph Williams, editor. American apartment houses of today, illustrating plans, details, exteriors and interiors of modern city and suburban apartment houses throughout the United States, edited by R. W. Sexton... New York: Architectural Book Publishing Co., Inc. [cop. 1926.] 3 p.l., xxii, 184, xxiii-xxx, 185-268, xxxi-xlviii p. illus. f°. **† MQWO**

Singleton, Esther. The collecting of antiques. New York: The Macmillan Company, 1926. xix p., 1 l., 338 p. illus. 4°. **MAVC**

Spargo, John. Early American pottery and china... New York, London: The Century Co. [cop. 1926.] xviii, 393 p., 64 pl. illus. 8°. (Century library of American antiques.) **MPH**

Vatter, Ernst. Religiöse Plastik der Naturvölker. Frankfurt am Main: Frankfurter Verlags-Anstalt A.-G., 1926. 192 p. illus. 8°. **MADF**

Venturi, Adolfo. A short history of Italian art; translated by Edward Hutton, with 300 illustrations. New York: The Macmillan Company, 1926. v, 376 p. illus. 8°. **MAMC**

CIRCULATION STATISTICS FOR THE MONTH OF FEBRUARY, 1927

BRANCHES	CIRCULATION		NEW REGISTRA- TIONS	VOLUMES ACCES- SIONED
	HOME USE (VOLUMES)	READERS OF REFERENCE BOOKS		
MANHATTAN				
Central Building:				
Central Circulation -----	54,830	----	747	1,093
Children's Room -----	2,927	3,690	75	122
Extension Division* -----	57,875	----	724	1,009
Library for the Blind -----	3,459	----	43	53
East Broadway, 33 -----	11,464	1,597	199	376
East Broadway, 192 -----	26,637	5,490	478	305
Rivington street, 61 -----	18,644	2,760	372	165
East Houston street, 388 -----	22,254	4,402	368	165
Leroy street, 66 -----	14,308	1,285	250	95
8th street, 135 Second avenue -----	13,913	1,063	267	252
10th street, 331 East -----	22,802	2,728	305	613
13th street, 251 West -----	11,604	1,401	202	307
23rd street, 228 East -----	10,852	1,542	212	193
23rd street, 209 West -----	9,759	1,596	252	200
36th street, 303 East -----	9,652	1,216	141	184
40th street, 457 West -----	11,864	701	198	315
50th street, 564 Lexington avenue -----	8,428	700	132	124
51st street, 742 Tenth avenue -----	13,807	918	179	37
58th street, 121 East -----	13,477	2,005	313	201
58th " 121 " Music Library -----	2,445	1,906	----	127
67th street, 328 East -----	17,207	2,664	246	757
69th street, 190 Amsterdam avenue -----	15,231	1,755	293	83
77th street, 1465 Avenue A -----	21,016	1,398	173	390
79th street, 222 East -----	19,893	1,433	312	237
81st street, 444 Amsterdam avenue -----	16,908	1,167	289	211
96th street, 112 East -----	31,336	3,927	439	900
100th street, 206 West -----	20,091	1,437	408	209
110th street, 174 East -----	26,154	3,369	553	289
115th street, 203 West -----	20,501	1,504	324	702
124th street, 9 West -----	12,125	1,466	229	598
125th street, 224 East -----	11,719	1,409	263	97
125th street, 518 West -----	19,979	1,297	355	137
135th street, 103 West -----	13,257	2,758	403	201
145th street, 503 West -----	22,922	1,110	328	185
St. Nicholas avenue, 1000 -----	19,226	1,867	388	287
179th street, 535 West -----	25,709	2,097	443	322
THE BRONX				
140th street, 321 East -----	21,276	2,382	396	358
Morris avenue, 910 -----	19,233	2,219	365	822
160th street, 761 East -----	34,024	4,814	615	569
168th street, 78 West -----	10,404	1,782	230	207
169th street, 610 East -----	30,295	3,179	606	394
176th street and Washington avenue -----	36,912	4,348	700	545
Bainbridge avenue, 2556 -----	35,040	3,463	791	178
Kingsbridge avenue, 3041 -----	5,293	546	58	70
RICHMOND				
St. George -----	8,687	2,748	192	127
Port Richmond -----	12,198	2,178	193	82
Stapleton -----	7,740	876	75	47
Tottenville -----	5,873	610	83	72
Totals -----	881,250	94,803	15,207	15,012

* In addition 9,043 books were read at agencies of the Extension Division.

PRINCIPAL DONORS IN FEBRUARY, 1927

	VOLS.	PMS.		VOLS.	PMS.
American Fashion Company - -	1		Kingdom of Serbs, Croats and Slovenes. Direction de la Statistique - - - - -	1	
Beedy, John - - - - -	1		Laidlaw, Dr. George Frederick -	1	
Beethoven Association - - -	1		Lanier, Mrs. Harriet - - - -	1	
Bolivia. Congreso Nacional, Biblioteca - - - - -	24	2	Latvia. Ministère des Affaires Étrangères - - - - -		2
Bolivia. Ministerio de Guerra y Colonizacion - - - - -		3	Lazarovich-Hrebelianovich, Prince	1	
Borchvogel, Miss Claire (collection of manuscript letters) - - -	4		Lithuanian Legation - - - -	1	
Briggs, Dr. Lloyd Vernon - - -	2		Lyman, Mrs. Moses - - - -		2
Brook, Arthur H. - - - - -		1	Maçao Harbour Works. Publicity Office - - - - -		2
Brooks, Mrs. William F. - - -		1	Macau, Provincia de. The Governor - - - - -	4	2
Catalonian Cultural Committee -	2		Malay States Information Agency	1	13
Chinese Information Bureau - -		6	Matulka, Jan (1 print) - - -		
Church Missions Publishing Company - - - - -	1		Mauritius. Colonial Secretary -	1	
Colasanti, J. M. - - - - -	1		Miller, Benjamin K. - - - -	1	
Comptoir d'Escompte de Genève -	1		Mondaini, Prof. Gennaro - - -	1	
Costa Rica. Oficina de Depósito y Internacional de Publicaciones -	63	2	Motley, Miss Maude - - - -	1	
Cuba. Secretario de Obras Publicas - - - - -	1		Mountain Club of South Africa -	1	
			Noble, H. H. - - - - -	1	
Day, Mrs. Benjamin M. (113 periodicals) - - - - -	8	2	Nold, Raymond - - - - -		52
Deobseavage, I. George - - - -	1	1	Pearson, Ralph M. (4 bookplates)		
Duran, Leo - - - - -	1		Pond, Wm. A. & Co. - - - -	3	
			Reeve, Sidney A. (16 charts) -	1	
Ellis, E. M. - - - - -	7		Regüeiferos y Boudet, Dr. Erasmo	2	2
Fennell, Fritz (2 prints) - - -			Reichner, Major Louis Irving -	1	
Fackenthal, B. F. - - - - -		1	Richardson, Lyon N. (2 photostat sheets) - - - - -		
Finley, Wilbur - - - - -	1		Royal Magnetical and Meteorological Observatory - - - -	2	13
Fishback, Reuben D. - - - -		1	Royal Society of Arts - - - -	1	
Flanders, Dr. Louis W. - - - -	1		Rubino, Antonio - - - - -	1	
Floan, John T. - - - - -	67		Ruggles, Henry Stoddard - - -		1
Forman, F. P. - - - - -		12			
			Sandiford, Roberto - - - - -		5
Germany. Reichstag - - - - -	8		Shufeldt, Dr. R. W. - - - -	1	
Gooch, F. A. - - - - -	1		Sims, J. G., Jr. - - - - -	2	
Graziella, Miss Thea - - - -	1		Sinks, Perry Wayland - - - -	1	
Grissold, Frank Gray - - - -	2	1	Smith, Harry Worcester (2 bookplates) - - - - -		
			Solon, Leon V. (49 cards) - - -		
Tagstrom, A. G. Company, Inc. (5 maps) - - - - -		1	Stephens, Miss Kate - - - -	2	1
Lambrecht, George P. - - - -		1	Swaz Majitelü Dolü - - - -	3	
Leide, Henry - - - - -	1		Szâdeczky, Dr. Louis - - - -	1	
Lenriquez y Carvajal, Dr. Federico - - - - -	2	3			
Lering, Mrs. Rudolph - - - -	85	3	Tkatch, M. - - - - -	1	
Lutty, Warren C. (1 print) - -					
			Ukrayinskyi Naukovyi Instytut Knyhoznavstva - - - -	1	8
Institut Archéologique Bulgare -	6		Utrecht, Netherlands. Universiteits-Bibliotheek - - - -	13	6
Ireland. National Library - - -	1				
Italy. R. Ufficio geologico - - -	2		Valladares, Antonio - - - -	1	
			Vseukrayinska Akademiya Nauk -	2	
Jane, Mrs. John I., Estate of (22 periodicals) - - - - -	836	63			
Kantorovitch, Haim - - - - -	2		Willcox & Swiger - - - - -	4	1
Keen, Mrs. Barton Longacre (1 print) - - - - -			Wistar Institute of Anatomy and Biology - - - - -	2	
Kessler, Rev. Israel - - - - -	1				

PUBLICATIONS OF THE NEW YORK PUBLIC LIBRARY

(Now in Print)

HISTORY AND GUIDES

	PRICE
History of The New York Public Library, by H. M. Lydenberg. 1923	\$2.00
Handbook of The New York Public Library	.25
Facts for the Public	.05
Central Building Guide	.05
Questions About Your Library (General Information about the Library)	Free
For Sightseers. Central Building	Free

PERIODICALS

Annual Report of The New York Public Library. (A limited number are given free upon request.)

Bulletin of The New York Public Library. Published monthly. Chiefly devoted to the Reference Department. Bibliography, news of the Library, reprints of manuscripts, descriptions of new accessions. \$1.00 a year; current single numbers for 10 cents. Back numbers at advanced rates.

Branch Library Book News. A selected list of new additions to the Circulation Department, with other lists and articles. Published monthly, except in July and August. For sale at the Branches and at the Inquiry Desk. 2 cents a copy; 25 cents a year, postpaid.

New Technical Books. A selected list of books on industrial arts and engineering, recently added to the Library. Published quarterly. 25 cents a year, postpaid.

Municipal Reference Library Notes. Published weekly except during July and August, for circulation among the officials and employees of the City of New York. Price: \$2.00 a year; 5 cents a copy. Apply at Room 512, Municipal Building.

LIST OF BOOKS IN THE LIBRARY RELATING TO VARIOUS TOPICS, TEXTS PRINTED FROM MANUSCRIPTS OWNED BY THE LIBRARY, ETC.

REFERENCE DEPARTMENT

	PRICE		PRICE
Almanacs, A list of New York, 1694-1850. 1921	1.00	Avery Collection, Handbook of. 1901. 84 p.	.50
American Inter-oceanic Canals. A list of references. 1916	.30	Avery Collection, Handbook of—Supplement: Additions of Prints, 1901-1920. 1921	.15
American-Romani Vocabulary, by Albert Thomas Sinclair. 1915	.05	Avesta and Romani, by Albert Thomas Sinclair. 1916	.05
Armenia and the Armenians. A list of references. 1919	.30	Beadle Collection of Dime Novels. 1922	.50
Article of Faith, An, by Hiller C. Wellman. 1919	.05	Beaumarchais, Editions of, in New York City. 1925	.15
Assyria and Babylonia. A list of references. 1918	.45	Berlin and the Prussian Court in 1798. From a ms. journal of Thomas Boylston Adams. 1916	.15
Astor Library, Catalogue of the. 8 volumes. Sewed. Per volume	5.00	Billings, Dr. John Shaw, Memorial Meeting in honor of the late. 1913	.10
Automobile Tires. A list of references. 1923	.10	British Genealogy and Local History, List of works relating to. 1910	1.15

	PRICE		PRICE
City Planning and Allied Topics, Select list of works relating to. 1913	.15	Historical Prints and Early Views of American Cities. Catalogue of Exhibition. 1917	.05
Color Photography. 1924	.75	Holcroft, Thomas, A Bibliography of. By Elbridge Colby. 1922	.60
Columbus. Letter of Columbus on the discovery of America. Facsimile of the pictorial edition, with a new and literal translation, and a complete reprint of the four oldest Latin editions. 1892. Cloth	.50	Holt, John—Printer and Postmaster. 1920	.10
Commencement Addresses by Stephen H. Olin and Carl B. Roden. 1924	.10	Hudson, Henry, The Hudson River, Robert Fulton and Steam Navigation, List of prints, books, manuscripts, etc., relating to. 1909	.30
The Compensations, by Asa Don Dickinson. 1922	.05	A Hundred Years of Grand Opera in New York, 1825-1925. A record of performances. 1927	1.00
Cruise of the U. S. Brig <i>Argus</i> in 1813. Journal of Surgeon James Inderwick. 1917	.10	Inks, Chemistry and Manufacture of. 1926	.75
Druids and Druidism. A list of references. 1920	.05	Inventory of the Rensselaerswyck Manuscripts. 1924	.25
Early American Children's Books, 1682-1840. 1927	.05	Irvingiana, The Seligman Collection of. 1926	.25
Early American Poetry, 1610 to 1820. A list of works. 1917	.20	Isle de Bourbon (Réunion) Documents, 1701-1710. Printed from the original manuscript in the Library. 1909	.20
Early Library Development in New York State. By George Watson Cole. 1927	.10	Japanese-American Relations. A list of works. 1921	.40
Echo-Device in Literature. By Elbridge Colby. 1920	.25	The Jewish Division in the Reference Department. 1926	Free
Egypt, Ancient. Sources of Information. 1925	2.75	Jewish Life in Oriental Countries. A list of books and manuscripts exhibited. 1927	.10
Emmet Collection of Mss., Prints, etc., Catalogue of. Sheets. 1900	5.00	Journalism. A bibliography. 1924	2.00
Eno Collection of New York City Views. 1925	.75	Joys of Librarianship, by Arthur E. Bostwick. 1918	.05
Flatboating on the Yellowstone, 1877. By Fred G. Bond. 1925	.25	Kennan Collection. By Abraham Yarmolinsky. 1921	.10
Folk Music of the Western Hemisphere. 1925	.50	Latin-American Periodicals Current in the Reference Department. 1920	.05
Gardens & Gardening. A selected list of books. 1927	.10	Letters of American Clergymen, 1711 to 1860. 1917	.05
Geology, Mineralogy and Palæontology of New Jersey, List of works on. 1916	.15	Letters of American Physicians and Surgeons. 1919	.05
Gypsies in Carniola and Carinthia, by Albert Thomas Sinclair. 1917	.05	The Librarian Himself, by H. L. Koopman. 1916	.05
Gypsies of Monastir, by Rev. Lewis Bond. 1917	.05	Librarian as a Unifier, by Andrew Keogh. 1915	.05
Henry George and the Single Tax. 1926	.50	Library Tonic, by George Parker Winship. 1917	.05
Heritage of the Modern Printer, by Margaret B. Stillwell. 1916	.05	The Lost Librarian, by Miss G. M. Walton. 1925	.10
Historical Printing Club, Publications of the. (List and prices furnished upon application.)		Lycanthropy. A list of works. 1920	.05
		Macpherson's Ossian and the Ossianic Controversy. A contribution towards a bibliography. 1926	.25
		The Manuscript Division, by Victor Hugo Paltsits. 1915	.15

	PRICE		PRICE
Mountaineering. Selected list. 1916	.05	Shakespeareana, Catalogue of Exhibition of, compiled by Henrietta C. Bartlett. 1916	1.00
Music Publishers in New York City before 1850. A directory. 1917	.10	The Soul of the Library, by J. I. Wyer. 1923	.05
Nationalization of Coal Mines. 1920	.10	Spalding Baseball Collection. 1922	.20
Naval Architecture and Shipbuilding. A list of references. 1919	.20	Stauffer Print Collection, by Charles Allen Munn. 1916	.05
The New York Public Library and the Business Man. 1923	Free	Storage Batteries. A list of references, 1900-1915. 1915	.15
The New York Tercentenary. An exhibition of the history of New Netherland, 1524-1674. 1926	.30	Submarines. A list of references. 1918	.35
Newspapers and Official Gazettes, Checklist of. 1915	1.85	Superstructures, by W. N. C. Carlton. 1918	.05
Numismatics. List of works. 1914	.65	Tilden, S. J. Letters and Literary Memorials, edited by John Bigelow. 2 v. 1908	6.00
Opera Plots, Index to. 1927	.75	Tilden, S. J. Writings and Speeches, edited by John Bigelow. 2 v. 1885	6.00
Orlando Gibbons Tercentenary, by Jeffrey Mark. 1926	.15	Timothy Dexter and His "Pickle for the Knowing Ones." 1922	.15
Oxy-Acetylene Welding. List. 1914	.15	To Nebraska in '57. A Diary of Erasmus F. Beadle. 1923	2.00
Pageants in Great Britain and the United States. A list of references 1916	.15	Torpedoes. A list of references. 1917	.30
Paintings, Catalogue of, in the picture galleries of the Library. 1927	.10	The Walt Whitman Exhibition. By Emory Holloway. 1925	Free
Persia, List of works relating to. 1915	.50	War Memorials. A list. 1919	.05
The Photostat in Reference Work. 1925	.15	War Taxation, 1914-1917. A list of references. 1917	.05
The Pitcairn Bible. 1924	.15	Washington Eulogies. A checklist. 1916	.25
Prints and their Production: Supplement. 1917	.05	Washington's Note Book. Selections from a newly discovered manuscript, edited by Victor Hugo Paltsits. 1920	.05
Provençal Literature & Language. 1925	3.00	What Did Macaulay Say About America? Text of four letters to Henry S. Randall. 1925	.40
Robinson Locke Dramatic Collection. 1925	.10	What's the Matter with the Public Library? By E. L. Pearson. 1922	Free
Romani and Dard, by George F. Black. 1916	.05	Why They Came to the Library. 1920	Free
Russian, other Slavonic and Baltic Periodicals, A list of. 1916	.15	Winthrop, Theodore, Bibliographical notes on, by Elbridge Colby. 1917	.05
Schoolroom Decoration. A list of references. 1917	.05	Winthrop Books, Plates of the, by Elbridge Colby. 1918	.05
Scotland. A list of works. 1916	3.00		
Selenium. A list of references, 1817-1925. 1927	.65		

MUNICIPAL REFERENCE LIBRARY

Publications to be obtained at the Municipal Reference Library, Room 512, Municipal Building.

	PRICE
Guide Posts on the Road to Health; A list of books	.10
Teaching Citizenship via the Movies. A survey of civic motion pictures	.10
Visualizing Citizenship	.15
What to Read on New York City Government. A list of references	.05

CIRCULATION DEPARTMENT

Publications to be obtained at any Branch Library, or from the Chief of the Circulation Department,
476 Fifth Avenue. Publications given free unless otherwise stated.

Branch Library Book News. *See* Periodicals.

LISTS OF BOOKS FOR ADULTS

Altman Collection

Books of Interest to Women Voters

Catalogue of Books for the Blind in Revised Braille. Grades One, Two and Three. November, 1921; Supplements, December, 1922, January, 1925

Catalogue of Books for the Blind in Revised Braille. Grade One-and-a-Half. November, 1921; Supplement, October, 1924; May, 1925

Catalogue of Books for the Blind in the Moon type. November, 1921; Supplements, December, 1922, October, 1924.

Catalogue of Music Scores in the Braille Type. July, 1922; Supplement, October, 1926.

Christmas Exhibit

Current Periodicals and Newspapers on File at the Branches

Fairy Tales for Grown-up Readers

List of Piano Music

Military Training

"The New York of the Novelists"

Old-Fashioned Novels

Plays of Thirteen Countries

Poetry of the Supernatural

Polish Book List

Romans à Clef; A List of Novels with Characters based on Real Persons. 2 cents.

Sailor's Yarns. 2 cents

Stories of Romance and Imagination

Stories of the Sea. 5 cents.

Supplement to the Catalogue of Music for the Blind. Music Scores in the American Braille and New York Point Types

Wanderers and Vagabonds

LISTS FOR CHILDREN

Favorite Stories of the Library Reading Clubs

Journeys to Foreign Lands

LISTS FOR ADULTS AND CHILDREN

New York City and the Development of Trade

Sea and Shore

The Shakespearian Festival

BOARD OF TRUSTEES

W. VINCENT ASTOR
 GEORGE F. BAKER, JR.
 SAMUEL GREENBAUM
 EDWARD S. HARKNESS
 PATRICK CARDINAL HAYES
 ARTHUR CURTISS JAMES

GREVILLE KANE
 LEWIS CASS LEDYARD
 JOHN G. MILBURN
 J. PIERPONT MORGAN
 MORGAN J. O'BRIEN
 WILLIAM BARCLAY PARSONS
 FRANK L. POLK

ELIHU ROOT
 EDWARD W. SHELDON
 I. N. PHELPS STOKES
 HENRY WALTERS
 PAYNE WHITNEY
 BRONSON WINTHROP

JAMES J. WALKER, Mayor of the City of New York, *ex officio*
 CHARLES W. BERRY, Comptroller of the City of New York, *ex officio*
 JOSEPH V. MCKEE, President of the Board of Aldermen, *ex officio*

OFFICERS

President, LEWIS CASS LEDYARD, 476 Fifth Avenue.

First Vice-President, ELIHU ROOT.

Second Vice-President, ———

Secretary, FRANK L. POLK.

Treasurer, EDWARD W. SHELDON, 45 Wall Street.

Assistant Treasurer, UNITED STATES TRUST COMPANY, 45 Wall Street.

Director, EDWIN H. ANDERSON, 476 Fifth Avenue.

Chief Reference Librarian, H. M. LYDENBERG, 476 Fifth Avenue.

Chief of the Circulation Department, FRANKLIN F. HOPPER, 476 Fifth Avenue.

Editor, EDMUND PEARSON, 476 Fifth Avenue.

BUILDINGS AND BRANCHES

CENTRAL BUILDING, 476 Fifth Avenue, contains general administrative offices of the whole system, all Divisions of the Reference Department, and the Central Circulation Branch, Central Children's Room, Library for the Blind, and the Extension Division.

MUNICIPAL REFERENCE BRANCH, Room 512, Municipal Building. (Free for reference.)

CIRCULATION BRANCHES

MANHATTAN

33 East Broadway. (Chatham Square.)
 192 East Broadway. (Seward Park.)
 61 Rivington Street.
 388 E. Houston St. (Hamilton Fish Park.)
 66 Leroy Street. (Hudson Park.)
 135 Second Avenue. Near Eighth Street.
 (Ottendorfer.)
 331 East 10th Street. (Tompkins Square.)
 251 West 13th Street. (Jackson Square.)
 228 East 23rd Street. (Epiphany.)
 209 West 23rd Street. (Muhlenberg.)
 303 East 36th Street. (St. Gabriel's Park.)
 457 West 40th Street.
 564 Lexington Avenue. (Cathedral.)
 742 Tenth Avenue. Near 51st Street.
 (Columbus.)
 121 East 58th Street.
 328 East 67th Street.
 190 Amsterdam Avenue. Near 69th Street.
 (Riverside.)
 1465 Avenue A. Near 78th St. (Webster.)
 222 East 79th Street. (Yorkville.)
 444 Amsterdam Avenue. Near 81st Street.
 (St. Agnes.)
 112 East 96th Street.
 206 West 100th Street. (Bloomingdale.)
 174 East 110th Street. (Aguilar.)
 203 West 115th Street.
 116th Street and Amsterdam Avenue. Room
 108a, Columbia University Library
 (Columbia Sub-branch.)
 9 West 124th Street. (Harlem Library.)
 224 East 125th Street.
 518 West 125th Street. (George Bruce.)

103 West 135th Street.
 503 West 145th Street. (Hamilton Grange.)
 1000 St. Nicholas Avenue. Cor. 160th Street.
 (Washington Heights.)
 535 West 179th Street. (Fort Washington.)
 215 Sherman Avenue. Near 204th Street.

THE BRONX

 321 East 140th Street. (Mott Haven.)
 761 East 160th Street. (Woodstock.)
 910 Morris Avenue. Corner 162nd Street.
 (Melrose.)
 78 West 168th Street. (High Bridge.)
 610 East 169th Street. (Morrisania.)
 1866 Washington Avenue. Cor. 176th Street.
 (Tremont.)
 80 West 181st Street. (University Heights
 Sub-branch.)
 1741 Wallace Ave. (Van Nest Sub-branch.)
 2556 Bainbridge Avenue. (Fordham.)
 3041 Kingsbridge Avenue. Near 230th Street.
 (Kingsbridge.)
 3917 White Plains Road. Near 223rd Street.
 (Williamsbridge Sub-branch.)
 325 City Island Avenue. (City Island Sub-
 branch.)

RICHMOND

5 Central Avenue, Staten Island.
 (St. George.)
 75 Bennett Street. (Port Richmond.)
 85 State Street. (West New Brighton
 Sub-branch.)
 132 Canal Street. (Stapleton.)
 7430 Amboy Road. (Tottenville.)
 56 Gifford's Lane. (Great Kills Sub-
 branch.)
 180 Rose Avenue. (New Dorp Sub-branch.)